

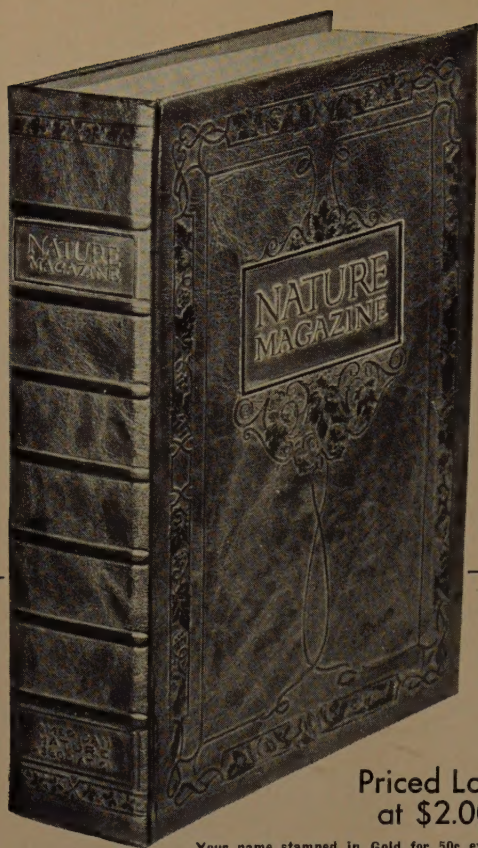
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AUGUST 1933

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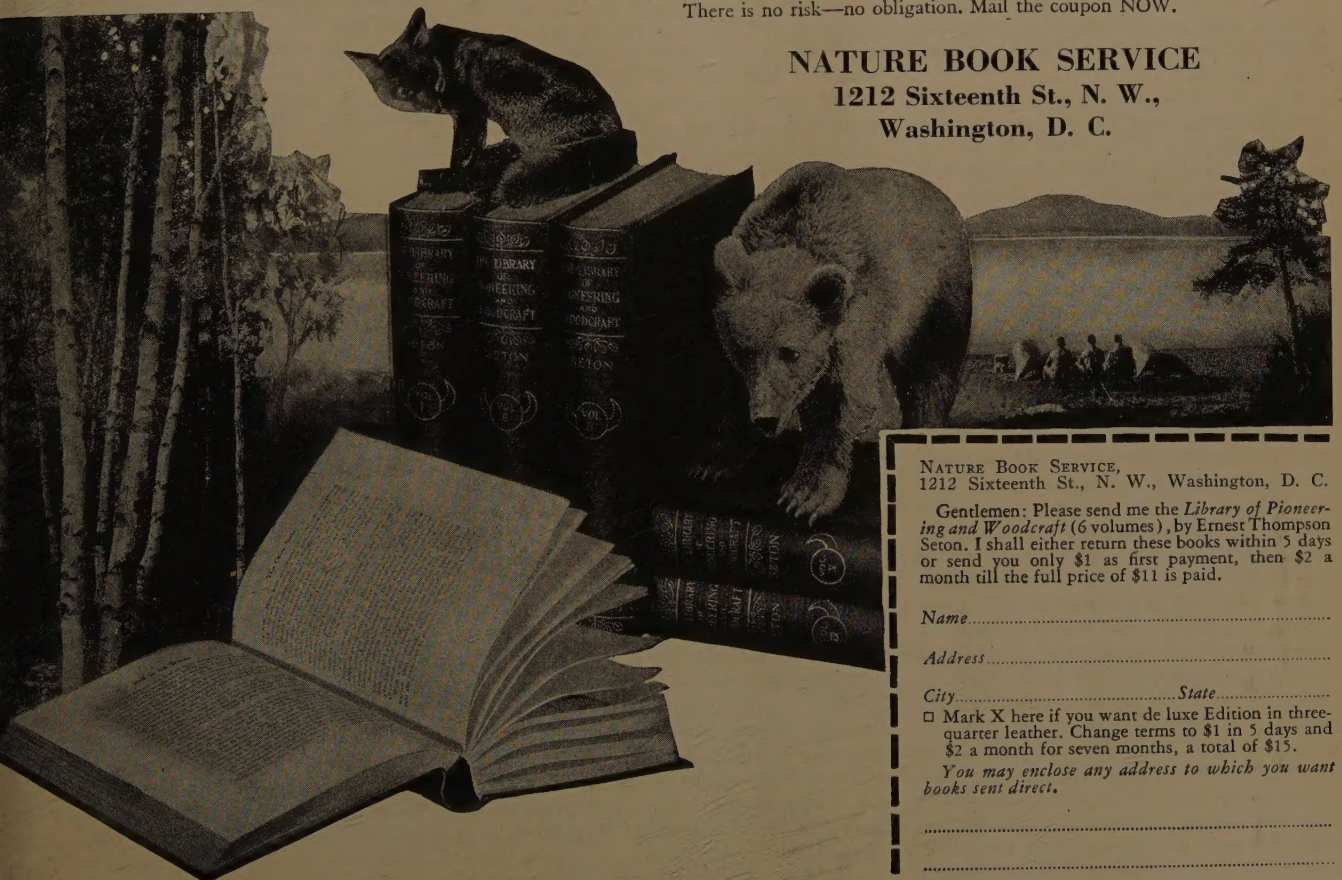
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TAKING PICTURES IN NATURAL COLOR

Color photography for the amateur has been the dream of many enthusiasts. The green trees and grace, the brilliant flowers and blue skies of summer, which register so beautifully in the picture-maker's finder or on his ground glass, often give disappointing effects when reduced to tones of black and white only. How many nature photographers have pointed their cameras at the autumn tints and the blazing brilliance of turning leaves, only to wish that they might have a picture rendering some of the true beauty of the original! This wish is today no mere dream. It can, at least in part, be fulfilled, for science has opened the door. Let us look within and see what science offers.

Processes for making natural color lantern slides for projection on a screen have been perfected and available for a number of years. The best known of these processes are the Lumiere and the Agfa Autochrome, for both of which one needs only a plate camera of about $3\frac{1}{4} \times 4\frac{1}{4}$ size, a special orange filter, and the special color plates. With this equipment in hand, the photographer sets up his camera on a tripod, focuses the picture on the ground glass, inserts the special plate and makes an exposure which is about sixty times as long as that required for a black and white picture. Instructions are available for home developing and finishing, or the plates can be sent to professionals qualified to do the finishing. Of course, the timing of the exposure has to be very carefully done with an accurate exposure meter, for, while one may get somewhat satisfactory black and white pictures from over-exposed or under-exposed negatives, color values are completely destroyed by any exposure mistake. The shortcomings of these processes mentioned above are due to the fact that practically all the pictures must be time exposures, and that the results can be shown only in a lantern slide projector.

Recently these processes have been made more generally adaptable. Not only are the plates available, but, for those who do not wish to be handicapped with the weight and bulk of a larger camera, special rolled color film for such small cameras as the Leica, Zeiss Contax, Ansco Memo, and others using standard motion picture film for the negative. The R. J. Fitzsimons Corporation, 75 Fifth Avenue, New York City, is offering Lumiere color film for these cameras and is prepared to do the necessary finishing. The cost of the film is about fifty cents per foot, and the cost of the finishing is fifty cents for about four or five feet. The necessary color filters for use over the lens when using color film are also available, and there are different ones for various light conditions, such as sunlight, arc lights, and incandescent lights. Of course, the speed of exposure is the same as for the old Lumiere plates—that is, it requires about sixty times as much as for a black and white picture. Nevertheless, if the small camera is equipped with a very fast lens, such as F 1.9, snapshots can be made at slow speed in very brilliant sunlight. The color effect is obtained by the use of thousands of minute starch grains underneath the emulsion, and these starch grains form the color mosaic. The film has to be loaded in the camera with the back towards the lens, instead of the emulsion side as ordinary film is loaded,



but the process is really simple enough for any amateur.

The resulting negative is reversed in the finishing process and so treated as to become a complete positive picture in full colors. Of course, it can not be pasted in an album and has to be projected onto a screen with any one of the numerous small projectors made by the manufacturers of cameras which use standard motion picture film for still pictures. Inasmuch as the original image on the film is very small and made up of thousands of minute grains of starch, it can not be very greatly enlarged in the projection; but, if the photographer will be content with a projected image not much more than a foot or two in size, he will be greatly pleased with the results.

Another color picture process also available for the same kind of miniature cameras is the du Pont "Du Pac" Process. This process has an advantage over the Lumiere color film in that it requires only a very slight increase in the exposure, and filters are not required. Hence, it is possible to make snapshots in ordinary light with any lens of F 3.5 speed. In comparison with the processes mentioned above, however, it has a disadvantage in that it is a two-color process instead of a three-color process, and the results are not quite so true to nature, although quite satisfactory in comparison with black and white. All materials and full information may be obtained from the du Pont Film Manufacturing Corporation, 35 West 45th Street, New York City. The developing and finishing can be carried out quite easily by the reasonably advanced amateur. The basis of the process is the use of two films in the camera at the same time. Both are rolled on the same spool. The front film has an emulsion primarily sensitive to the blues and greens, and the back of it is coated with an orange filter dye. The rear film is a panchromatic emulsion which is sensitive to red light, and one will naturally see that a picture taken on panchromatic film through the red back of the front film registers primarily the tones at the red end of the spectrum. After taking, the two films are separately developed in the usual way. Positive prints are made from both. Then the two corresponding prints for each picture are dyed, one red and the other green, carefully matched, and bound together permanently to form miniature lantern slides which can be shown with small projectors.

It must be understood that all subjects to be photographed in natural color have to be chosen with a view to eliminating violent contrasts of light and shadow. The reason is that the shadows, lacking in color themselves, are very apt to take on the tint from the surrounding color. Thus, a deep shadow in a landscape may appear blue because of the sky above, or reddish from the presence of a building nearby.

One of the newest and most effective of all processes for taking still pictures in natural color is the Finlay Process. It is a three-color process using a special panchromatic plate and from it obtaining a

perfect picture in natural color with one exposure. It has the advantage of speed, in that in bright sunlight one may take a snapshot of $1/25$ of a second at F 8, and other exposures are proportionate. The Finlay Process also has the advantage of permitting one to make as many color transparencies as he wishes from a single negative, and also to obtain black and white photographic prints from the same original plate. The color rendering is about as nearly perfect as it has been possible to obtain and rather more brilliant than that obtained by other methods. This is the process by which most of the newer commercial color pictures are taken, but it is adaptable for use without great expense by a reasonably experienced amateur.

Any ordinary plate camera and lens will do the work, but special plate holders are generally required because each holder must contain not only the Finlay plate, but also a screen of geometric pattern, composed of red, green, and blue-violet squares in regular sequence. A special filter is also used over the lens. Different screens have to be used for different kinds of lighting, such as bright sunlight, cloudy days, and artificial illumination. After the picture is taken, the plate is developed in the usual manner for a black and white plate, but with particular care. It is a black and white plate only, and no color is visible. This plate is then used to produce a positive plate, just as one prints an ordinary photographic negative, but the positive plate, when finished, is bound with a special viewing screen similar to the screen used over the plate when taking the original picture. The positive plate and the viewing screen together make a lantern slide or a color transparency, and as many copies as needed are turned out in the same manner. An amateur outfit, including half a dozen negative plates, positive plates, filters, and screens, together with developer, binding tape and clips, is sold at the cost of ten dollars, plus postage. Full information and prices may be obtained from Charles W. Beck, Jr., Agent, 305 East 45th Street, New York City.

COLOR MOVIES

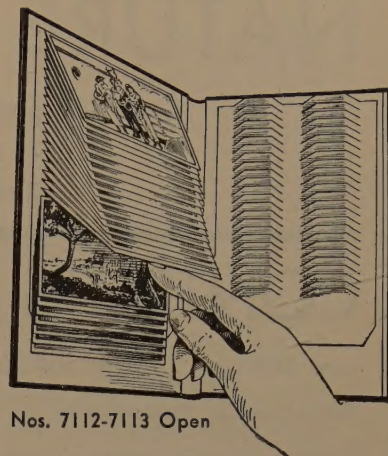
Amateur motion pictures in natural color can be produced by almost any owner of a 16 mm. motion picture camera by the Kodacolor Process. In line with their policy of making everything as simple as possible for the amateur, the Eastman Kodak Company has developed this three-color process to the point where it is hardly more difficult to take motion pictures in color than in black and white. To be sure, it is necessary to have pretty bright sunlight and a lens as fast as F 1.9. Such lenses are available for practically all 16 mm. cameras. Assuming that the original investment in a motion picture camera has been made, and that we already have suitable lenses, it is only necessary to spend a few dollars for a color filter and two extra filters to compensate for varying light conditions, to load the camera with Eastman supersensitive Kodacolor film and to proceed according to directions. The processing of the film is all done by the Eastman Kodak Company and paid for in the original cost of the film. Kodacolor film in 16 mm. size can be obtained at about \$7.50 per 100-foot roll. The finished film received back from the developing laboratory shows

(Continued on page 96)

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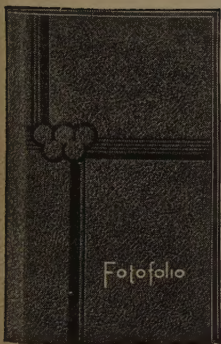
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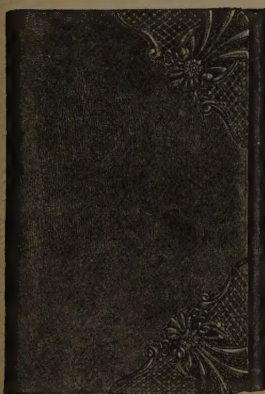
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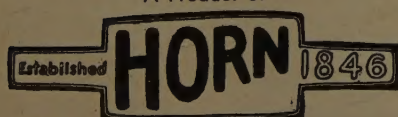
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NATURE IN WASHINGTON

• • •

WHY THE FEDERAL CITY IS OUTSTANDING IN ITS CHARM

• • •

WE WERE sitting, one recent Sunday afternoon, part way up a long flight of now disused steps that lead from the military road below to the Lee Mansion in Arlington National Cemetery. This stairway traverses a now unused part of this lovely place and dates back to the days when people walked. About were great oaks and elms that have known at least a century of life. From their branches sounded the calls and songs of many birds. A little chipping sparrow bobbed its russet brown head as it foraged in the grass a few yards away. Two bluebirds made streaks of blue in the sunlight on an opposite slope. There was a flash as a scarlet tanager whirled overhead.

From where we sat we could look out across the Potomac at the glistening white of what to us is the noblest of shrines—the Lincoln Memorial. To the right the pinnacle of the Washington Monument reached into the blue heaven. A bit beyond was the spire of the ancient Smithsonian, and near it the dome of the new National Museum. Still beyond, the Capitol on its hill. Sitting in the quiet of this hallowed spot we felt an ineffable appreciation of the beauty of the National City.

Idly, because it was a warm afternoon, we caught at the tails of random thoughts as they wandered lazily through our mind. Here before us lay a man-made city. It was a symbol of a people and a country. It stood for politics, diplomacy, and the business of government. It had all the features of a city—stores, streets and traffic lights. It had noble buildings of steel, cement and marble. It also had squalid alley dwellings, and poverty and despair. After all, was it not just another city; another congregation of people striving for food and shelter, for comfort and amusement?

No, we told ourselves, Washington deserves more than merely to be grouped as just one more city. It has, of course, an advantage over other cities in that it holds, within its ten square miles of area, the seat of national government. This has given distinction to its buildings, a distinction not of gargantuan, sky-reaching proportion but of dignity and authority. Yet splendid though many of its buildings may be, it is not their façades, cornices and pillars that give Washington its charm. Nor

is it the many monuments, imposing residences of diplomatists, fine homes and broad streets, that provide the answer to the Federal City's enchantment.

To see all these things thousands come from far and wide every year. Many make frenzied tours of the public buildings and the points of interest. They carry back with them a picture of a beautiful and imposing city packed with things of historical importance and national significance. They have seen the Congress in session, watched money being made, seen the gowns of the wives of the Presidents, gazed at Lindbergh's plane, stood silently at the tomb of the Unknown Soldier and bowed before the great Lincoln within his pillared monument.

All these, indeed, have their meaning and are worthy of the seeing. But, we wonder, how many stop to realize why Washington is a picture of beauty in their memories? The reason was not far to seek, to us, as we sat beneath the cemetery oak. Across the river the city was set in green. There was the answer. All these other things were of man's making. It is Nature who has given the color and adornment that makes Washington different. Where else are city streets shaded by trees even in the business district? Where else are there so many parks, each one groomed and planted with beautiful and varied flowers? How many cities can boast a place so naturally lovely as Rock Creek Park, or so significant of man's cooperation with Nature as the reaches of Potomac Park and the Mall?

Indeed, for the lover of Nature Washington is rich. Within walls are the priceless exhibits of the National Museum; within glass and borders the beauties of the Botanic Gardens; within fences the collection of the National Zoological Park. For him who seeks Nature knowledge the sources are varied and the best.

As we rose to leave our resting place we thought that although Man cannot leave Nature unspoiled and natural within the city limits, it is something to his credit that he realizes her gifts and uses them intelligently. This he has done in Washington, and this is the reason for its charm. Every citizen should come to see it and gain inspiration.



A STUDY IN SILHOUETTE

BY

FLORENCE K. TOMLINSON

NATURE MAGAZINE

VOLUME 22

AUGUST · 1933

NUMBER 2

• • •

HOTTEST, COLDEST, WETTEST, DRIEST

WHAT THE WEATHER CAN DO WHEN IT TRIES

BY CHARLES FITZHUGH TALMAN

THE English journal *Tit-Bits* once offered a prize for the worst pun. Here in America we have dance marathons. Almost any kind of record-breaking interests a certain percentage of humanity, and some kinds interest nearly everybody.

Thus it happens that among the questions the public asks the weatherman a goodly proportion relate to record-breaking performances of weather. There is a wide range of these meteorological superlatives concerning which people are curious, but much the largest number of inquiries have to do with two elements of weather—temperature and rainfall. What are the farthest ups and downs of the thermometer ever observed in the world? What are the corresponding extremes for a particular country? What are the wettest and driest places on the globe or within some specified region, and what is the rainfall at these places? How much rain has been known to fall in a given time? These are some of the queries that continually crop up in the weatherman's mail.

The answers to such questions are subject to revision from year to year. Statistics of weather are a product of comparatively recent times; mainly of the past two generations. Hence the extremes of bygone

years are frequently surpassed. Thus within less than two decades the "world record" for high air-temperature was successively 127, 134 and 136 degrees Fahrenheit, and the last of these figures, which is the highest to date, may be exceeded any day.

Every year of rainfall measurements at any place makes, as a rule, at least a slight change in the average deduced from the whole series of measurements. Hence the figures for the heaviest and lightest average yearly rainfall occurring in the world or in a specified country usually vary somewhat each year, even though the same places may continue to hold the blue ribbons for wetness and dry-

ness, respectively. At the Chilean town that at present holds the world's championship for rain-scarcity a single brisk shower would materially alter the yearly average and might make it many times as great as it is now.

Purely local records, especially those relating to particular dates, are broken somewhere every day. No item of news is more familiar than the announcement that such and such a place has had "the coldest December 1st," or "the hottest June 10th," or the like, in the history of the local weather station. If the history in question does not run back more than fifteen



PHOTOGRAPH BY HARRY J. LIEK

FINDING ARCHDEACON STUCK'S THERMOMETER

Uncovered on Parker Pass, Mount McKinley, in May, 1932, it was enclosed in a small wooden box with the name "Stuck" rudely carved on the cover



ARICA, CHILE—THE DRIEST KNOWN SPOT ON THE EARTH

The average rainfall for 17 years was only 0.02 inch a year—and there were only three measurable showers during the whole of that time

RAIN GAUGES WITH A BIT OF LOCAL COLOR

The instruments at the weather station at Cherrapunji on a precipice facing the Bay of Bengal have indicated that this spot is the most rain-soaked in all the world so far as is known



THE BARREN WASTE OF VERKHOTYANSK, SIBERIA

The weather station at this village holds—for the present—the world's blue ribbon for frigid weather



or twenty years, such a statement is hardly worth printing.

Statistics of extreme weather, besides being variable, are sometimes of doubtful accuracy. The instrument from which an extraordinary reading has been obtained may have been defective or badly exposed. The observer may have been careless—or worse. At one time, it is said, there was so much rivalry among weather observers in Australia to obtain high readings of their thermometers that a good many of their reports had to be taken with a grain of salt. Moreover, a meteorological instrument records, at best, merely what happens in its immediate vicinity, and in many cases it would, in a slightly different location, furnish a very different reading.

For these reasons science sets little store by definite figures in connection with weather extremes, but is, on the other hand, much interested in their "order of magnitude." Whether 134 or 136 in the shade is the top notch of torridity thus far registered at a weather station is a question of no real importance; but it is decidedly important, for both scientific and practical reasons, to know approximately how hot the weather ever gets anywhere in the world, and also to know where excessive heat is likely to occur and at what season of the year.

We can now say, in a general way, that the hottest weather on earth is not found anywhere near the equator, but prevails, during the summer half-year, in the great desert areas that lie, partly in the temperate zones, near the Tropics of Cancer and Capricorn. In these areas, during a longer summer day than occurs in lower latitudes, a combination of clear skies, dry air and bare soil leads to an intense heating of the ground, and the latter, in turn, heats the air adjacent to it.

Weather stations are too scarce in these deserts to give us more

than random samples of atmospheric conditions. The highest individual reading of a thermometer happens to have been made at a place 600 miles, and the next highest at one 900 miles, north of the Tropic of Cancer; but with the establishment of new stations it is entirely possible that still higher readings will be obtained inside the torrid zone, though certainly not very far inside. Neither is it impossible that the hot weather championship will some day go to a place in the southern hemisphere. There is an explorer's record of 131 in the interior of Australia.

The present "highest on record"—136, at Azizia, Tripolitania, September 13, 1922—has been a subject of some controversy and may turn out to be erroneous. The surrounding country is subject to spells of intense heat, but this reading is several degrees higher than any recorded at the other stations in the same Italian colony, including some much farther inland and more exposed to typical desert conditions than Azizia, which is only 25 miles from the Mediterranean.

There is much less mystery and uncertainty about the temperature of 134 registered July 10, 1913, at the little weather station on the border of Death Valley, which figures in Weather Bureau records as Greenland Ranch, though the name Furnace Creek Ranch is now more usual in the locality. The station is in about the same latitude as Norfolk, Virginia, but it is 178 feet below sea level and in the midst of a large desert region that has always been notorious for excessive summer heat.

The worst hot spells in Death Valley are supposed to occur when air, already intensely heated over the surrounding higher desert, drifts down into the valley and undergoes further heating by compression. Almost every summer the Greenland Ranch station registers the highest temperature observed anywhere in the United States, and



PHOTOGRAPH BY POL TRISTAN

HOT-WEATHER REFUGES AT AZIZIA, TRIPOLITANIA

These subterranean dwellings are said to be fairly comfortable in the worst hot spells. This North African town has registered 136 in the shade—the world record for torridity to date



PHOTOGRAPH FROM THE REV. S. EVANS

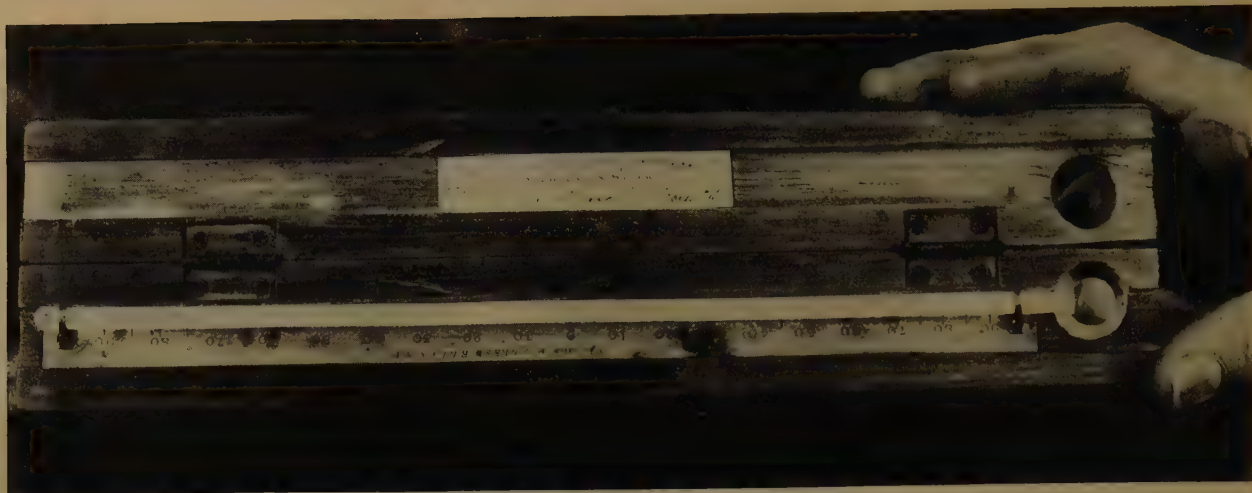
THE RAIN-DRENCHED CLIFF OF CHERRAPUNJI

Of it G. B. Williams, an English engineer, writes that it is "a fascinating place at any time, but particularly so during the rainy season, when huge masses of clouds mobilizing from the plains below keep up a continual attack on the line of rugged precipices, enveloping them for months in thick mist and soaking them with moisture"

WEATHER STATION AT OIMEKON IN SIBERIA

The winters here are believed to be even colder than at Verkhoyansk





ARCHDEACON STUCK'S RECORD-BREAKING THERMOMETER

Note the little index rod down in the bulb, as far as it will go. This may mean that the temperature fell to more than the 100 degrees below zero some time during the nineteen years the instrument lay on a lofty slope of Mount McKinley, Alaska

from June to September inclusive there is rarely a day on which the mercury does not rise to 100 or higher. This place has also the lightest known rainfall in the country, averaging only 1.45 inches a year.

Both Azizia and Death Valley are cool in winter. The latter, which has become a resort for winter tourists, once had a spell of 72 consecutive days on which the temperature fell to the freezing point, and on one occasion it fell to 15 above zero (17 degrees below freezing).

So much for the hot spots of the earth. Turning now to the opposite extreme of temperature, the most important thing to be said about the world's coldest weather is that, in all probability, it occurs where there are no human beings to measure it. We can be reasonably sure that it does not occur at the place in north-central Siberia that has long enjoyed the reputation of being the "winter cold pole" of the globe.

Verkhoyansk, the village of some three hundred inhabitants that is world-renowned for its severe winters, lies about a degree of latitude north of the Arctic Circle in a large basin, surrounded by mountains, where a pool of dry stagnant air forms in winter under clear skies. The air cools rapidly by radiation, and a covering of loose snow is an effective insulator in checking the outflow of heat stored in the ground. The official weather station at this place has registered 90 degrees Fahrenheit below zero, and some authorities believe this reading requires a correction, on account of supposed defects of the thermometer, that would reduce it to about 94 below.

There is no doubt about the severity of the winters here; though they are said to be less dreaded by the inhabitants than the summers, which bring, besides a certain amount of uncomfortably hot weather (94 above zero has been recorded on a summer day), a frightful plague of mosquitoes. Neither is there any doubt that another Siberian valley, the district of Oimekon, which lies some 400 miles southeast of Verkhoyansk and well inside the temperate zone, has winters at least rivaling those of the place whose name has become a proverb for frigidity. Stories of the terrific cold at Oimekon have

long been current in Siberia—it is said, for example, that the hardy Siberian ponies, which endure the winters at Verkhoyansk, perish at Oimekon—and the brief records of a weather station recently opened at the latter place seem to indicate that it will, sooner or later, register a temperature lower than Verkhoyansk's lowest.

There is, however, reason to believe that the coldest winter weather does not prevail near any existing weather station, but on the summit of some lofty mountain or plateau in polar or circumpolar latitudes. Dr. Griffith Taylor, who has had experience in the Antarctic and whose guess is as good as anybody's, thinks the real "cold pole" may be located at the top of Mount Nilsen, 15,000 feet above sea level in the interior of the Antarctic continent. Dr. H. U. Sverdrup, the Norwegian meteorologist and authority on the Arctic, has calculated that a temperature as low as 130 below zero is possible on the summit of the great Greenland ice cap.

An actual thermometer reading much lower than any ever made at Verkhoyansk has been obtained, under romantic circumstances, on a lofty slope of Mount McKinley, in Alaska. When the late Archdeacon Hudson Stuck climbed this highest of North American mountains in the summer of 1913, he cached on Parker Pass, at an altitude of 15,000 feet, an accurate minimum thermometer, graduated down to 93 degrees below zero. Such an instrument is designed to register the lowest temperature occurring at any time after its index is once set and the instrument is placed in position.

Nineteen years later—in May, 1932—Stuck's thermometer was found by another climbing party and brought back to civilization. Its index had gone beyond the lowest graduation of the scale and was projecting into the bulb, where it could go no further. Its position indicated a minimum temperature, during the period of exposure, of at least 100 degrees below zero, and perhaps a few degrees lower!

It is a pity to spoil a good story by admitting that this sensational record does not positively dispose of Verkhoyansk's claims to being the cold pole of the earth, be-

cause an instrument of the type mentioned, however excellent, is subject to certain accidents (especially the jarring of the index out of its correct position by the wind) that may cause it to read too low when left to its own devices for so long a period of time. The evidence is not conclusive that a temperature of 100 below zero has occurred on Parker Pass; but meteorologists believe it is not impossible in that lofty subarctic locality.

The rainiest place on the globe, like the coldest, has probably not yet been located. We cannot even say definitely which of the world's 35,000 weather stations measures the most rain on an average each year (there are now about half a dozen rivals for this distinction), but so far as stations having long and trustworthy records go it seems that the one at Cherrapunji, in the Khasi Hills of Assam, still deserves its long-established reputation of being the rainiest. The latest reported average for this place is 428 inches a year; about ten times the rainfall of New York City.

Cherrapunji is 4,100 feet above sea level, at the top of a lofty precipice facing the Bay of Bengal, 200 miles distant. The surrounding topography tends to concentrate the moisture-bearing southwest monsoon winds, which besides coming from the Bay blow over a great tract of inundated land in summer, and the altitude of the place is that at which a maximum amount of water is condensed when the winds are deflected upward and cooled by expansion. The rainfall is light in the winter months, when these winds do not blow. An English

authority has recently suggested that the rainfall of certain mountain localities in Bhutan, the independent state lying north of Assam, may surpass that of the famous station in the Khasi Hills, but no rain-gauges have yet been installed there.

The driest known place in the world is Arica, Chile, with an average annual rainfall, from a 17-year record, of only 0.02 inch. During the whole 17 years of observations, there were only three measurable showers. Let us hope the man who measures rainfall at Arica has other jobs to occupy his mind!

The heaviest 24-hour rainfall on record was 46 inches, falling from noon of July 14 to noon of July 15, 1911, at Baguio, the mountain health resort in the Philippines. This was part of a 4-day downpour, attending the passage of a typhoon, that almost completely destroyed the famous Benguet Road, leading to the top of the mountain.

The hardest brief shower ever measured was one that occurred at Opid's Camp, on the San Gabriel Range of southern California, April 5, 1926, when of two self-registering rain-gauges standing four feet apart one registered 1.03 inches and the other 0.92 inch in a single minute. Rain-gauges designed for measuring the intensity of brief showers are few and far between, and torrential downpours are usually limited to small areas, so that the vast majority of them fail to be registered. Probably much heavier cloudbursts have occurred than the one just mentioned.

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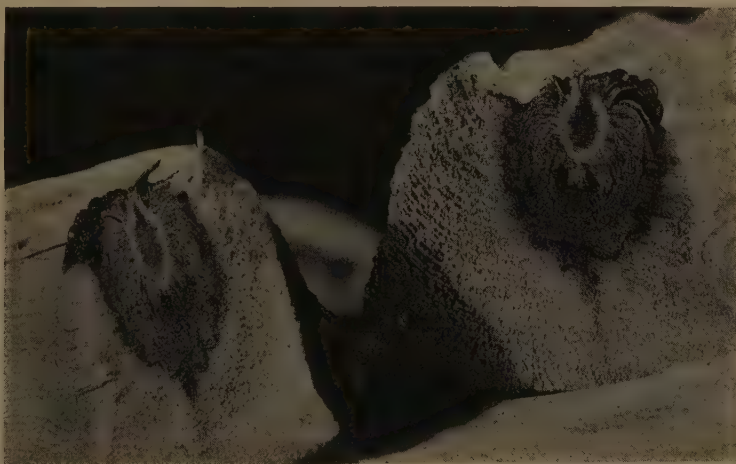
NATURE FOOLS THE FIRE

BY MAUD MATTOX KEITHLEY

A LODGEPOLE pine cone often develops on the main stem, or trunk, of a small tree. As the tree grows it becomes completely covered by the layers of wood added each year. The size of the cone varies from two to three inches, so it would require twenty-four years, at an annual tree growth of one-eighth of an inch, to imbed or completely cover a three-inch cone. The cone in the picture formed on a mere sapling. It took thirty years for it to grow to full size and become completely imbedded in the trunk.

When the tree was one hundred and sixty years old it was killed by fire. Splitting the log near the center revealed the cone. The log was then sawed crosswise and through the cone.

This imbedding of cones in trees is one of Nature's ways to preserve seed in places where there have been forest fires. It would seem that every form of seed would be destroyed on burned-over ground, but lodgepole re-



produces profusely. What takes place? Burning of the trees releases the imbedded cones, and the heat opens them. Sometimes, even though the cones appear to be badly burned, there will be seeds that have not been killed.

The opening process of the cone is so very slow that the ash from the fire has cooled before the seeds fall into it. Lodgepole seeds are among the few that will germinate in ash, and one of the most remarkable things about them is that they have been known to retain their vitality for forty years, and still have a germinative force of forty per cent at the conclusion of that time.



A GROUP OF THREE IRISES THAT WILL ADD DISTINCTION TO ANY GARDEN

At the left is "Luna", one of the new hybrids with a candy stripe effect. In the center is "Lord Wolseley", one of the *Spuria* group. At the right is an iris known as "Dorak", distinguished by the quaint markings of the *Pogocyclus* hybrids

IRISES OF VARIED HUES

BY ROBERT WAYMAN

THE lover of "outdoor" Nature may look upon the wonderfully improved forms of garden irises as a bit sophisticated, although unquestionably they are among the most beautiful and satisfactory of garden flowers. Years of hybridizing by amateurs and professionals have developed them to their present high state of perfection.

The iris family is divided into three principal groups—bearded irises, distinguished by a hairy appendage on three of the petals, known as the beard; beardless irises, in which this is missing, and bulbous irises. Until recently most of the enthusiasm has centered around the better known class of tall bearded irises, but much interest has recently been aroused in beardless species, gathered from the far corners of the globe. Asia Minor, Europe, the Himalayas, Japan, China and Africa, as well as many parts of North America, have each contributed its quota. These wild species show wide variation in size and form from ordinary garden irises, and many are extremely handsome. Being wild forms, they are rugged and hardy, and especially useful for naturalizing, for rock gardens and for planting along the edge of a rivulet, pool or lake, either just above the water line or in shallow water. They are suitable for semi-shady locations, and if a few are planted and left to themselves in an uninviting bit of swamp land, they will quickly spread and convert it into a veritable Garden of Eden.

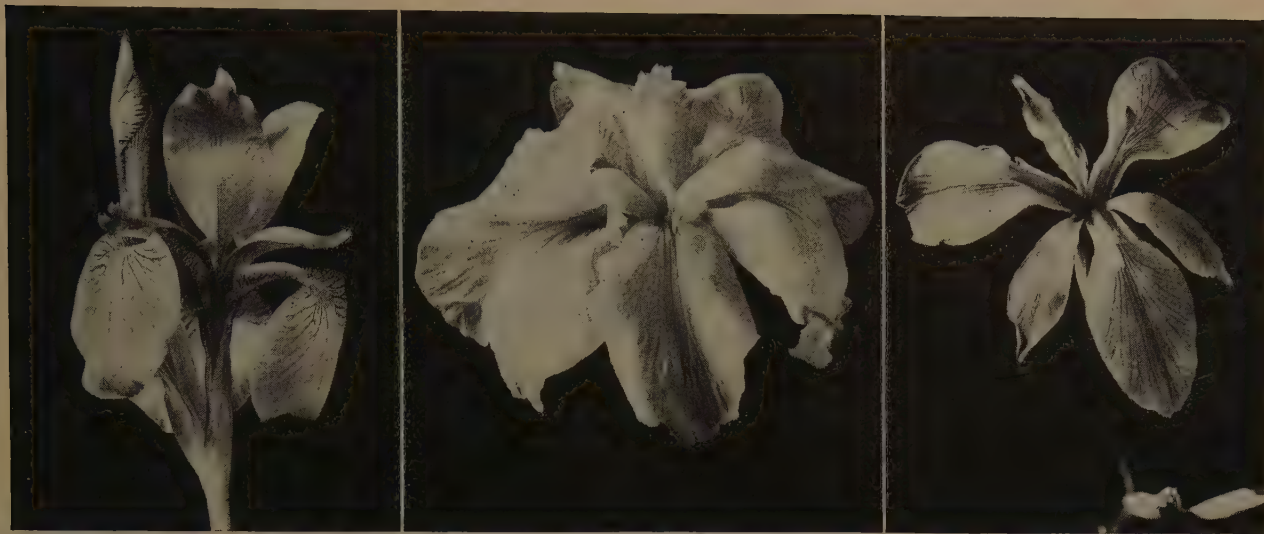
In addition to these natural beardless species, many handsome hybrids have been created by crossing various species. A vast unexplored field is ahead for amateurs and professionals to delve into Nature's possibilities. With the wealth of newly discovered material at hand great developments in the beardless iris section are in-

evitable. Just as the magnificent new tall bearded irises are the outcome of crossing numerous wild types, so may we expect similar development in the beardless family. In fact, many wonderful new things have already put in appearance, quite different from anything heretofore existing, and a rather comprehensive planting is possible.

Iris versicolor, our native wild purple species of the northern states, and *I. virginica*, its lighter colored form, with *Iris pseudacorus*, the handsome deep yellow iris native to Europe and the Mediterranean region, are usually found growing to best advantage in moist places, even in bogs or along the edges of streams. This may create the erroneous impression that all irises are water plants or require constant moisture, but this is not true. There are only a few that will grow in water. Although all of the beardless group enjoy plenty of moisture, they also do well under ordinary garden culture. *Kermesina* and *Rosea*, two handsome red-toned varieties, and *Stella Main*, a new white form, are hybrids of *I. versicolor*.

Iris fulva is a lovely copper-colored species native to our southern states and an outstanding one on account of its unusual metallic-copper tone. It is quite hardy in the north, and like nearly all other beardless species, enjoys semi-shade and plenty of moisture. *Iris foliosa* is a rich, blue-violet species, the brilliant flowers nestling down among the foliage. These two species, *Iris fulva* and *I. foliosa*, have been crossed in creating Dorothy K. Williamson, a brilliant, velvety, royal purple; and other species have been crossed to create *Fulvala*, a coppery-red-purple.

Iris chrysographes is one of the richest of all species and was given an Award of Merit by the Royal Horticultural Society of England. It is a Chinese species with



THREE MORE IRISES OFFERING WIDE VARIATION IN THE FORM OF THE BLOOM

At the left a Siberian iris, a group offering the most permanent and generally-thriving kinds. In the center a "double" Japanese iris with six petals. At the right is "Fulva", a deep burnished copper. It grows best in semi-shade and a moist location

flowers of richest, velvety, violet-purple, with a gold bar down the centre of the petals. It was discovered by the late Dr. E. H. Wilson.

Iris prismatica, sometimes called the cubeseed iris on account of its cubical seeds, is a lovely American species with dainty white flowers having a violet veining. It is usually found growing wild in boggy ground, but seems to make itself quite at home anywhere.

Some remarkable new species have recently been discovered by Dr. Small in the swamps and bayous of Louisiana. Among them are *Iris violipurpurea*, a tall, fragrant, blue-violet species, and *I. vinicolor*, a fragrant, wine-colored variety.

There is also a group of beardless irises known as the Spuria group, with flowers much like the iris of the florists's shop. A good collection would consist of Monnieri, a rich, golden yellow; Mrs. A. W. Tait, porcelain blue; Lord Wolseley, deep purple, and Ochroleuca, ivory white.

I have touched but briefly this group of beardless iris but have, I trust, shown that it is a most important section of the iris family, especially for naturalizing.

One of the great advantages accruing from the introduction of these beardless species and their hybrids is the lengthening of the flowering season. Instead of having irises in our gardens during May and June only, we may now have them from earliest spring until late fall, and, with a little special effort, on through the twelve months.

The Siberian irises, which belong to the beardless group, come mainly in shades of blue and purple, and in white. Though liking a moist spot, they are perhaps the most tolerant of all irises, being at home most anywhere, even in a high, dry location. They are prodigious bloomers and seem to do equally well in full sun or semi-shade. This group is especially attractive along the edge of a pool, just above the water line.

Here is a calendar of twelve months' iris bloom:

Iris reticulata, a hardy bulbous iris from the Caucasus,

produces its violet-scented, pansy-violet-colored flowers ahead of the crocus in early spring. Not less than a dozen bulbs should be planted in a sunny, well-drained spot in the rock garden.

These are followed by the miniature irises for the rock garden and front of the border. They bloom in April and early May in the latitude of New York. All colors are now to be had in these miniatures.

Following these come the pogocyclus hybrids, beautifully striped and marked, a handsome new race, loving dry, hot, sunny locations and limestone soil. A liberal dressing of ground limestone, bone meal, coal or wood ashes suits their appetites. These hybrids help fill the gap between the miniatures and the main display of the tall bearded type.

Differing from the "flags" that made gay our grandmothers' gardens in late May and June, present-day tall bearded irises have a range of color and quality of flower little dreamed of then. Besides those colors usually associated with iris we now have blends of bronze and copper, orchid-pinks, fiery reds and myriads of subtle shades and tones. Flowering with these are the Siberian irises already mentioned, and following them the beardless species and hybrids fill in the gap until the Japanese irises put in their appearance.

Considering their marvelous beauty, ease of culture and season of bloom, it is really astonishing that more plantings do not include Japanese irises. Their immense three and six-petaled blooms, generously produced upon tall stems, may easily become high-lights of the midsummer garden. They are perfectly hardy and easy to grow, and while enjoying a moist soil, will thrive in average good garden loam. Planted upon the margin of a pool or stream is their ideal location.

From North China comes the Vasper iris, *I. dichotoma*, blooming for several weeks in late midsummer when no other species are in flower. Though individual flowers last but a day it is a prolific bloomer with established plants producing as many as two hundred blossoms in a

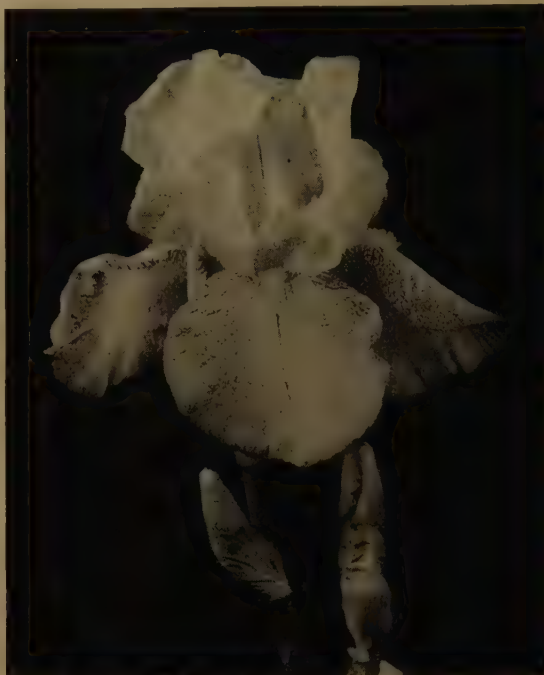
single season. The flowers vary in color from soft blue to purple.

Fall-blooming irises are comparatively new. Hybridizers have been working with them during recent years until we now have a race of irises that flower twice a year, profusely in early spring and again from September until frost. There are Autumn King, a deep purple; Autumn Queen, a fine white; Ultra, a new ultramarine blue; Golden Harvest, a fine yellow, and many others.

If your garden enjoys a climate no more severe than that in the latitude of New York, you can have the pleasure of an iris season eight months long with some varieties in bloom almost all the time. Milder sections will do even better.

There is, however, one group of irises whose natural blooming season is winter rather than summer. In fact, they insist upon perfect rest and the entire absence of moisture during summer. This is accomplished by covering them with a cold frame during summer months and with-

holding all moisture until fall. Then they will start growth and bloom all winter with merely the protection of the cold frame. This variety is *Iris unguicularis* (*I. stylosa*), which comes in both a beautiful lavender and a white.



"KING CARL", A TALL BEARDED IRIS

A beautiful and colorful iris

to add to your collection. Make your landscape a rainbow with many months of iris bloom.

LEGS

AMONG the Arthropoda (invertebrates with locomotor appendages), there are other characteristic uses for legs besides that of progression. Spiders use their feet to direct the placing of their web strands; some centipedes possess poison glands in their claws; the legs of burrowing insects are developed for digging; many killers depend more on their armed tarsi for capturing their prey than upon their jaws, and the leapers surpass all other creatures in proportional power.

The question has been raised regarding the special function of exceedingly long legs. The crane-flies and the stilt-bugs merely lift themselves out of the way of their shorter-legged, predatory



THREE WITH IMPORTANT LEGS

The giant crane-fly, the thread bug, and the familiar thousand-legs

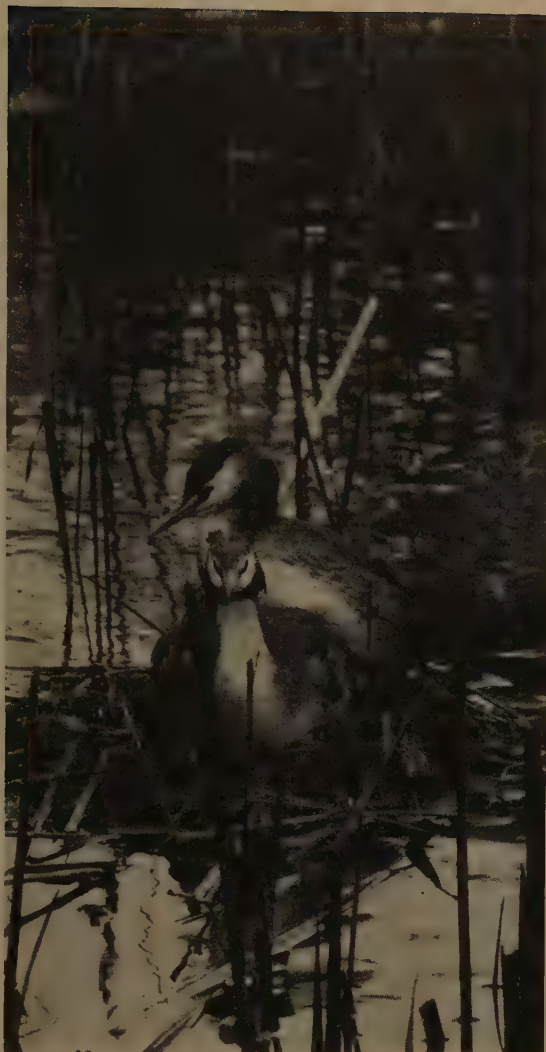
it cannot climb as well as a six-legged ant and is no more certain of clinging than a butterfly with but four used legs.

BY S. F. AARON

foes. The pedipalpi, commonly called daddy-long-legs, being distinctly predacious, use their legs also as traps for their victims, surrounding them with a sort of cage, and this may have led to the pedal development of the palpi as one more check against escape.

The need of excessive numbers of legs is less understood. To what use can *Julus*, the slow-moving Diplopod known to boys commonly as "thousand-leggers", put its more than two hundred legs, two pairs to each of its more than half a hundred body segments? The creature moves no faster than a caterpillar;

A BIRD OF THE NORFOLK BROADS



"IT'S MY TURN NOW, OLD MAN"

The mother grebe offers to take over the task of sitting on the island nest

THE CRESTED grebe has always been one of my favorites. Perhaps it is because it resembles, in certain poses, a Plantagenet, who was a gentleman with long lank locks and cap with a pointed peak; perhaps because of its beautiful black and white plumage that is varied with chestnut brown and gray; or perhaps because of its broad, pearly-white chest which nearly caused its extermination some years ago.

After the last summer, I feel more fond of it than ever, because I watched two families grow up under the tutelage of their parents on their tiny raft homes, and photographed them in all stages of development.

Through the courtesy of Mr. John Cator of Woodbastwick

A STUDY OF THE
FAMILY LIFE AND
NESTING HABITS OF
THE CRESTED GREBE

BY
FRANCIS HEATHERLY

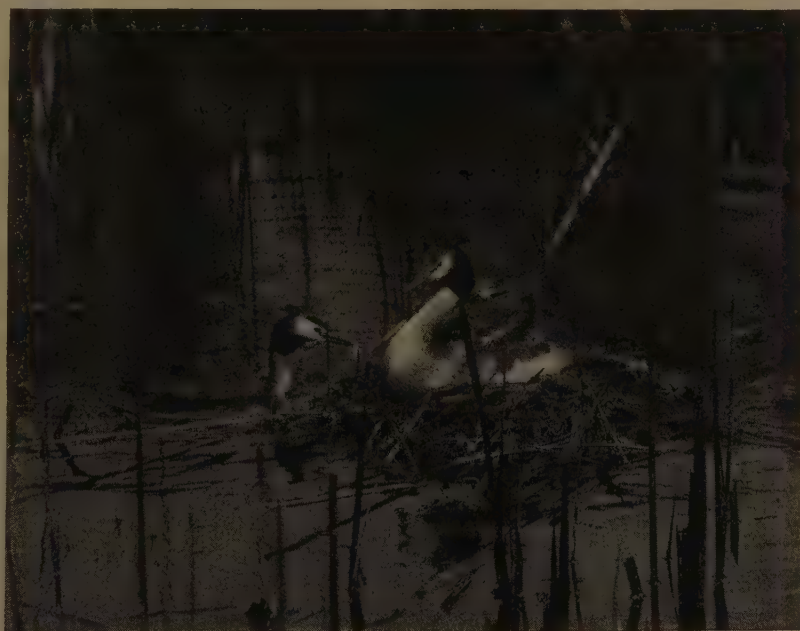
PHOTOGRAPHS BY THE
AUTHOR

Hall, who opened to me one of the Norfolk Broads, I reveled for two weeks in the companionship of these birds, with no one to come near me, except by appointment, and no sounds and sights of civilization.

The first nest I discovered was a raft-like structure about twenty feet out in the broad.

I set up my Willford shed, which was shaped like a short sentry box, and made up of artist's canvas bolted and screwed together, on a punt, which I moored about twenty feet from the grebe house-boats. Here I left it until the birds became accustomed to it, then brought it to within nine feet of the brooding parents and their four eggs.

The grebes were apparently



THE MOTHER COMES BACK FROM A FISHING TRIP

While the father sits on the nest, the female grebe proffers a luscious minnow to the chick



THE MALE
GREBE WITH
CREST ERECT

On his back may
be seen the little
chick with its black
and white zebra-
like stripes

• • •

MOTHER HAS
A LOOK AT
A NEW BABY

She stands up on
the nest to see if
all is well with the
chick that has just
broken its shell



not very intelligent, and seemed utterly fooled by my ruse. Although they both were timid about coming on the eggs, once on the nest all fear seemed to vanish, and I had no need to be quiet. A noise such as caused by striking a match aroused only slight interest, and even the toppling over of a beer bottle caused but a quizzical look.

The chicks of the first nest began to hatch out the day after I arrived on the scene, and one of the four eggs released its prisoner each twenty-four hours. They were most peculiar fellows with their yellow coats decorated with longitudinal stripes. They resembled zebras. When first hatched, each had a large blood-red patch on its forehead which rapidly shrunk in size and was hardly noticeable after a few days.

The chicks seemed to spend most of their time on the back of whichever parent happened to be on the nest. When the sitting bird left the home, it always dived off

with the young safely stowed under its wings. I never saw one fall off, but on the return journey one or more nearly always tumbled into the water, due to the fact that just before clambering back into the nest the old bird raised its wings.

This carriage of the young is a very necessary precaution in grebe life. On one occasion I saw a big pike stick its snout up out of the water by the side of the nest. The mortality among the babies during the first few days of their life is apparently great. The two nests that I

visited lost three of their eight chicks even before the last chick was hatched, and I did not notice any signs of illness.

The grebes sat on the nest alternately, but did not seem to have regular watches, as is the case with the black-headed gulls, who relieve one another at the nest every hour with the precision of Big Ben. On one occasion the male grebe sat for three hours at a stretch, and even then was reluctant to leave, although



APPEARING TO BE BORED WITH SITTING ON THE NEST

The mother grebe opens her competent bill with a gargantuan yawn as she awaits the return of the father to take over the task



FEEDING THE BABY A FEATHER

Yes, that's correct. The chick is on the parental back for this ticklish process



THE MOTHER TURNS OVER THE EGGS

Taking account of stock and seeing that the eggs will be properly done on all sides

the female jumped on the nest beside him and caused it to rock ominously.

How the birds get from the water into the nest is one of the mysterious bits of water magic difficult to understand. The grebes breast the edge of the nest, stand up, and tread water vigorously until the entire raft bobs up and down, then suddenly they shoot up in the air and land safely with both feet on the frail deck. It appears to be somewhat a process of lifting themselves by their bootstraps.

After a grebe parent leaves the nest, it immediately goes fishing, and returns every five or ten minutes with a minnow in its beak for the chicks. Every day was Friday for them, and I did not see them eat anything else, except feathers. Yes, you read correctly—feathers.

Even when a minnow was declined, the young birds would eat feathers, taken from along the loose ones on the parent's breast. The only other bird that has this peculiar habit, to

my knowledge, is the peregrine falcon. Even if the feather was refused at first by the youngsters, it was eagerly grabbed after the parent had dipped it in the water.

Frequently, a hearty and rapid conversation was kept up between the sitting bird and the one that was swimming about. Their voices were harsh, unmusical and difficult to describe. On one occasion, when the male was exhorting a chick to swallow its minnow, it sounded like a puppy worrying a slipper.

It seemed that I had hardly got acquainted with my birds before they were ready to leave the nest. Just a few hours after the last chick had been hatched, they all took to the water, and travelled over the broad like two cruisers trailed by destroyers. And my days of photographing and enjoying them were at an end. But my days of remembering them will last as long as I, and I am happy that they are no longer in danger of extinction.



THE FEMALE ON THE NEST

This gives an excellent idea of the character and location of the nest of the grebe



has been able to shoulder the responsibility placed upon him by the death of his father. His silhouettes have been used for illustration, decoration, patterns, holiday cards, and have been acquired by libraries, schools and private individuals. His home is in Toccoa, Georgia. He gets his ideas from extensive reading of magazines and books and his favorite field, as was Joe Jones', is that of Nature.

AN ARTIST OF SILHOUETTE

• • •

Some years ago we published some delightful silhouettes cut by the deft scissors of crippled Joe Cranstoun Jones. Joe has now gone to a land where, we are sure, there is no suffering. But his mantle appears to have fallen on competent shoulders, as these silhouettes by George Hitt amply testify.

As did Joe, George lives in Georgia. And, again as with Joe, he cannot run in the fields and roam in the forest. His life is spent in his bed and his horizon is within the walls of his room. George is now twenty and has been steadily perfecting himself in the art of silhouette for nearly four years. So great is his physical handicap that he cannot feed himself, but his hands can hold the black paper and the scissors that snip out the paper in the right places.

George has found an active market for his work and



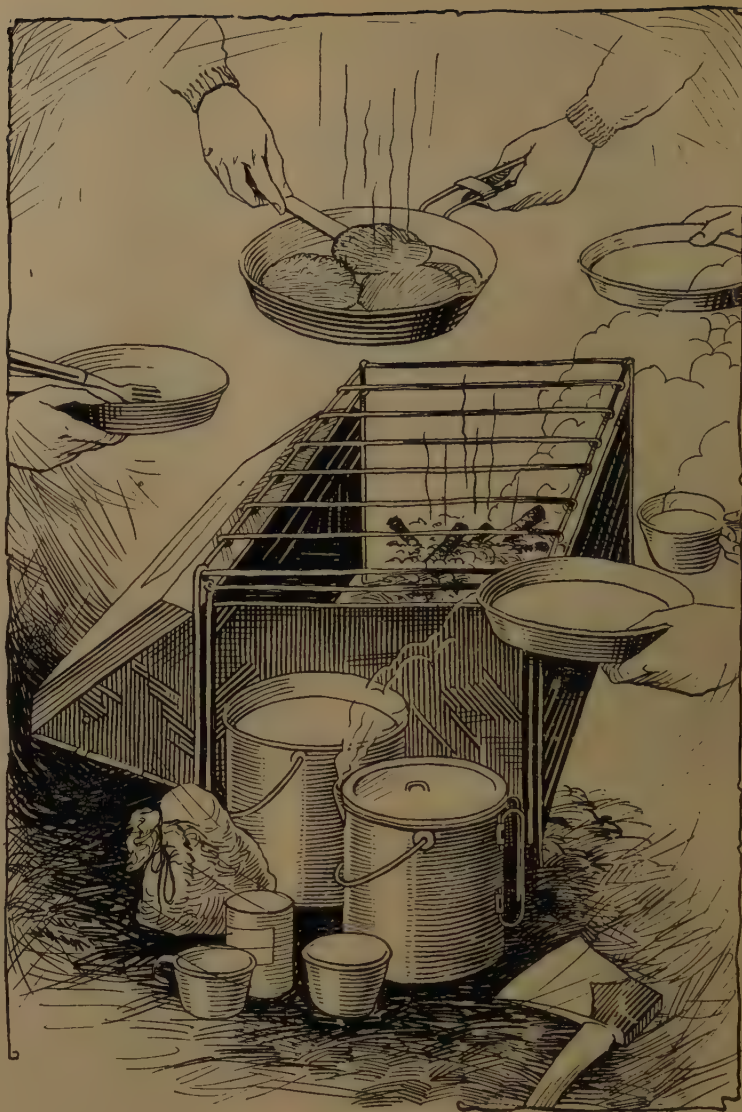


CAMP COOKS AND COOKERY

BY ARTHUR NEWTON PACK

ILLUSTRATED BY JEX

This is another article in the series on how to camp comfortably and under a variety of conditions. Here Mr. Pack deals with that important question of keeping the inner man happy because, like Napoleon's army, the contented camper must give thought to his stomach. The Camping Editor will be glad to give any further advice or references stimulated by this or previous articles in the group.



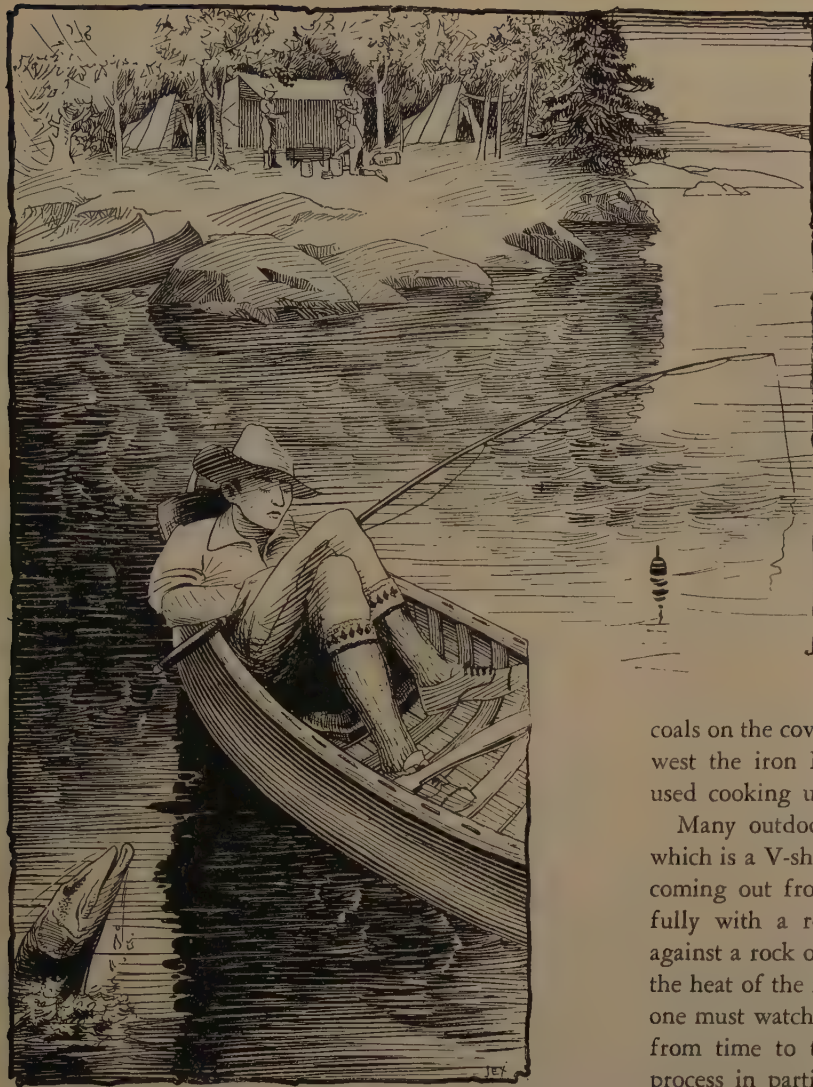
THE TWIN charms of camping are sleeping and eating out of doors. Sleeping out with the right equipment is so simple and comfortable, and the first two or three meals out of doors are equally easy. Outdoor life develops that comprehensive outdoor appetite which even does away with greasy bacon and all the strange products of the frying pan with gusto; but continued camping without a good cook is all too often an unduly severe test upon friendship, just as it makes for too ready an introduction to the bicarbonate of soda package. A woman who understands cooking at home can easily become a good camp cook, but for her the drawback is that she does cook at home and that job, pursuing her into the open spaces, may spoil half the fun. The fact is that almost any man who likes to make things, who has a suppressed desire to putter with chemistry or physics, may find in camp cooking the answer to a long-felt want. Every group that goes camping together ought to be able to find in its number a potential cook and then give to him or to her the full responsibility. There are advantages in being the camp cook. Camping etiquette and camping custom say that the cook shall be freed from certain other tasks. It is not up to him to cut the wood and haul the water.

The camp cook should be responsible for all the cooking utensils and provisions. He should have a sense of organization, so that he is able to put his hands on whatever he needs. Therefore, it is his duty to get out the cooking utensils and to stow them away again; it is his responsibility to be sure, when he leaves camp to go

fishing, hunting, or photographing, that the supplies are hung up out of reach of wandering porcupines, squirrels and mice. But the cook's job should be no harder than anyone else's. Custom among most campers dictates that once the meal is prepared and eaten the cook shall be free to rest or do whatever he pleases. A hired professional cook, of course, cleans the pans and washes the dishes, but the elected cook of a volunteer party is entitled to bequeath the major part of that job to someone else.

Where one travels with an automobile, camp cooking is greatly simplified because of that marvelous invention, the gasoline stove. With it there are no smoked-up pots. There is no uncertainty as to the oven temperature. The firewood problem does not exist, unless we want the cheery blaze of a camp fire, anyhow, or may use it for toasting or broiling with a grill. One can do wonders with a two-burner gasoline stove and a folding oven small enough to be worked by one burner. The large folding ovens which cover the whole stove deprive the cook of any other burner to work with, and they do not seem to produce such good results.

All too often the frying pan and the coffee pot are the main utensils of the camp cook, but it should be



remembered that even continuous outdoor living will not permit digestions to operate continuously on fried food. It is a good rule never to have more than one fried dish for each meal. Even then the frying should be done with a very hot pan so that the food will not become impregnated with grease. If we have fried fish or meat, then we certainly should not have fried potatoes. Far better make it boiled potatoes, creamed potatoes, or boiled rice. Rice, incidentally, is much easier to carry than potatoes and makes an excellent substitute. If we can afford the weight and bulk in our packing, there is an infinite variety of canned vegetables and fruits. If not, then there are the dried vegetable soups and dried fruits, which are excellent. Some of the dried vegetables are fairly good.

Of course, if we are only motor camping, we probably have room for baker's bread, bought at the last store, but on real trips into the wilds, with canoe or horses, we can not take all our own bread and have to bake. One can now buy ready mixed biscuit flour, to which it is necessary to add only water or milk and there you are. To learn to bake biscuits is easy, even without an oven. The old camper's trick for making bread without any utensils is to cut and peel a club about two or three inches in diameter, which he sticks into the ground,

leaning it over the embers. He then works his biscuit dough into strips and winds it spirally in both directions over the peeled end of the club to roast. The result is a pleasant and quite satisfactory product. Another camper's standby is corn bread which can be made just like biscuit dough, using half and half corn meal and white flour instead of all white flour. If we have an oven, so much the better. If not, we can take an iron skillet, fit into it a deep plate raised from the bottom by a couple of pebbles, pour our dough on the plate, put on the skillet cover, or, in lieu of that, a flat hot rock, and there we have the backwoodsman's Dutch oven. Every camping outfit should include a small shovel. We take a shovel full of hot coals, set the previously heated skillet with the dough in it thereon, and then put more hot

coals on the cover. In the mountain regions of our Southwest the iron Dutch oven becomes the most generally used cooking utensil.

Many outdoor cooks prefer a folding reflector oven which is a V-shaped affair of polished metal with a shelf coming out from the point of the V. To bake successfully with a reflector oven requires a high fire built against a rock or a background of logs built up to throw the heat of the fire towards the reflector. In such an oven one must watch the process of baking very carefully and, from time to time, turn the pans around. This latter process in particular requires skill and practice, because the beginner either gets his fingers burned, knocks over the oven, or takes so long about it that the dough suffers a chill and the resulting bread is flat and heavy. All baking with a wood fire requires more or less practice to maintain just the right heat. The protagonists of the reflectors or Dutch ovens will argue as violently as a couple of golfers over the merits of somebody's mashie; but each will ordinarily produce as good bread, biscuits and cake as anyone may ask for.

Life in the open engenders a desire for sweets. A good camp cook can easily learn how to produce some simple cake or cookies, and pie becomes every camp cook's ambition. The simplest recipes are, of course, the best. An ingenious performer at the fire may learn that a round fishing rod case makes an excellent roller, and the cleanly wiped top of a pack box is all the bread board he needs. Culinary triumphs produced under unfavorable circumstances afford a satisfaction to both producer and consumer almost unparalleled among the ordinary accomplishments of everyday life.

Perhaps we should leave the finer arts to return to first principles for a moment. It is surprising how few people know how to build a fire for outdoor cooking. Except for baking with a reflector oven, a bright blaze has no place in a cooking fire. The need is for a good

bed of hot coals. If the wood is split up into short pieces about $1\frac{1}{2}$ " to 2" in diameter and built up into a hollow square a couple of feet high, then a fire started in the center will burn down the whole structure at about the same time into a fine bed of coals. Over this real cooking fire we may suspend our pots from a framework with pot hooks and chains or in any other manner. One of the best easily portable outdoor cooking outfits is a simple grid held up by four wire stakes. A still further improvement is a folding grid with sheet metal sides and end to confine the fire and shut out side drafts. Such



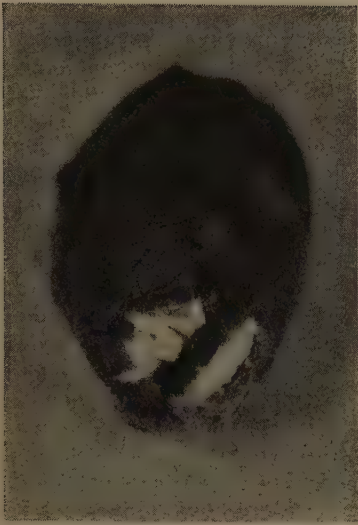
an arrangement will make it possible to do a large amount of cooking over a small fire. Camping goods dealers sell an outfit of this kind complete with folding oven which attaches to one of the metal sides, frying pan and grill for broiling and toasting. This is known as the Nugget outfit. It is light and occupies a small space. It is well worth taking on any trip where it is impossible to take along fuel for a gasoline stove and where a full inclosed wood stove offers too much bulk and trouble. Of course, a portable, full inclosed stove with a stove pipe is a splendid thing for a large party, particularly in country where bad weather may be expected. The stove may be used inside the cook tent with stove pipe going out through the roof, and no matter how hard it rains, the cook can always serve dinner promptly. However, to pack, set up and take down a folding stove and stove pipe is a considerable job wherein bruised fingers and blackened clothes perhaps more than compensate for the freedom from blackened pots and pans.

Campers' cooking utensils, so designed that the pots and pans nest inside one another and occupy a minimum of space, are now made and sold by dealers in camping goods. Aluminum cuts down on the weight. However, it should be noted that aluminum transmits heat very rapidly and aluminum cups and plates have burned more fingers than any other kind of utensils. We may keep our aluminum pots, but use tin or enamel ware plates and cups. Knives and forks of stainless steel are a good investment. Personally, I prefer rather deep plates without any flat rim. These plates are of just a size to go inside the skillet to become baking pans, and they will even hold soup. I have one kettle larger in diameter than the outside measurements of the plates, as this kettle becomes the dishpan. It is only about $7\frac{1}{2}$ " deep, so that it will fit sideways into a pack box for horse transportation.

The best way to carry dry staples is in waterproof cloth bags. They may be procured in 1-pound, 2-pound, 5-pound, and 10-pound sizes. Our reserve supplies we carry also tied up in waterproof bags which pack readily into a side-opening duffel bag. The cook hangs up or lays out the duffel bag of supplies near at hand, and there is his kitchen cabinet. Knives, forks, spoons, can opener and other utensils may be carried in a canvas roll with pockets, and this will also hang up near the fire. For other necessities which will not go well in bags, one can purchase friction top cans which will close again as tightly as ever after they are once opened.

By many campers butter is regarded as a decided luxury, but as one always has to take along lard or Crisco for shortening or frying, we find it just as easy to take along butter, which may be procured in one-pound cans and in this form will keep almost indefinitely. Even if the butter melts, it will re-solidify when put in a cool place. Of course, this does not apply to a can that has once been opened. Eggs may be carried safely in metal egg-containers sold to farmers for shipping eggs. They can be purchased in sizes for two dozen eggs upwards from Sears Roebuck, Montgomery Ward, and other mail order houses.

One of the greatest conveniences of the camp kitchen is some sort of a table that keeps the food off the ground and away from ants or blowing sand. It is not necessary that the table be large enough so that every one can sit down to eat, but it can be the source of supply, where the dishes of food are set out by the cook and the plates and utensils stacked alongside. One can secure a folding table about the size of a card table, the legs of which fold up into a small bundle, while the top rolls around them. This package can be carried on a horse, in a canoe, or anywhere. An even simpler camp table can be made by sewing strips of plasterer's (Continued on page 88)



LUNA— QUEEN OF THE EVENING— EMERGES

BY MARION STAPLES HALLER

PHOTOGRAPHS BY THE AUTHOR

On the front cover of *Nature Magazine* you have seen the lovely luna moth in all its beauty as photographed by Mr. and Mrs. Haller. Here Mrs. Haller tells the story of this picture and presents pictures of the emergence of the moth. On this page is seen the cocoon, the first appearance of the moth's plumes and the wet and still folded moth. On the next pages we see it develop.



THE GRACEFUL, shimmering, green luna moth is a delightful and familiar sight on summer evenings. Out of the dusk it often appears, easily recognized by its long swallow tails and surprising camouflage eyes on both upper and lower wings. For a brief moment this ethereal luna, lover of the moon, may linger for your admiration, and then, as softly as the breeze, it will be gone.

Even in its birth, or emergence from the delicate brown cocoon, this lovely creature is evasive. No fan-fare heralds its arrival, even though it is accepted and acclaimed as queen of the evening!

Silently and quickly the luna moth comes forth from the cocoon it made as a larva, and within an hour the moist crumpled wings have been transformed from much the size and appearance of two withered peas to their full expanse and mature beauty.

To witness this emergence is worth the months of watchful waiting it necessitates. In the hope that we might be fortunate enough to greet at least one regal luna as it



stepped forth from its humble winter abode, we purchased six of these cocoons from a dealer in this commodity.

The first two emergers eluded our vigil and reversed our plans by greeting us in all their glory on our own emergence in the morning.

But Fate was doubly kind to us finally, to make up for our earlier disappointments. One morning as my husband and I were setting up the camera for a close-up picture of some flowers from the garden, six-year-old son, trailed by his three-year-old sister, came shrieking the glad tidings that one of the cocoons was "ticking." And true enough, it was! The moth within the cocoon, in frantic haste, was breaking through an exit with her two front feet, and as each silk fibre of the cocoon casing broke it "ticked," almost as rapidly and softly as a wristwatch.

With as much haste as the luna was exhibiting, we replaced the garden bouquet with the "ticking" cocoon. Presently the opening in end of the cocoon was wide enough to show the white plumes back of

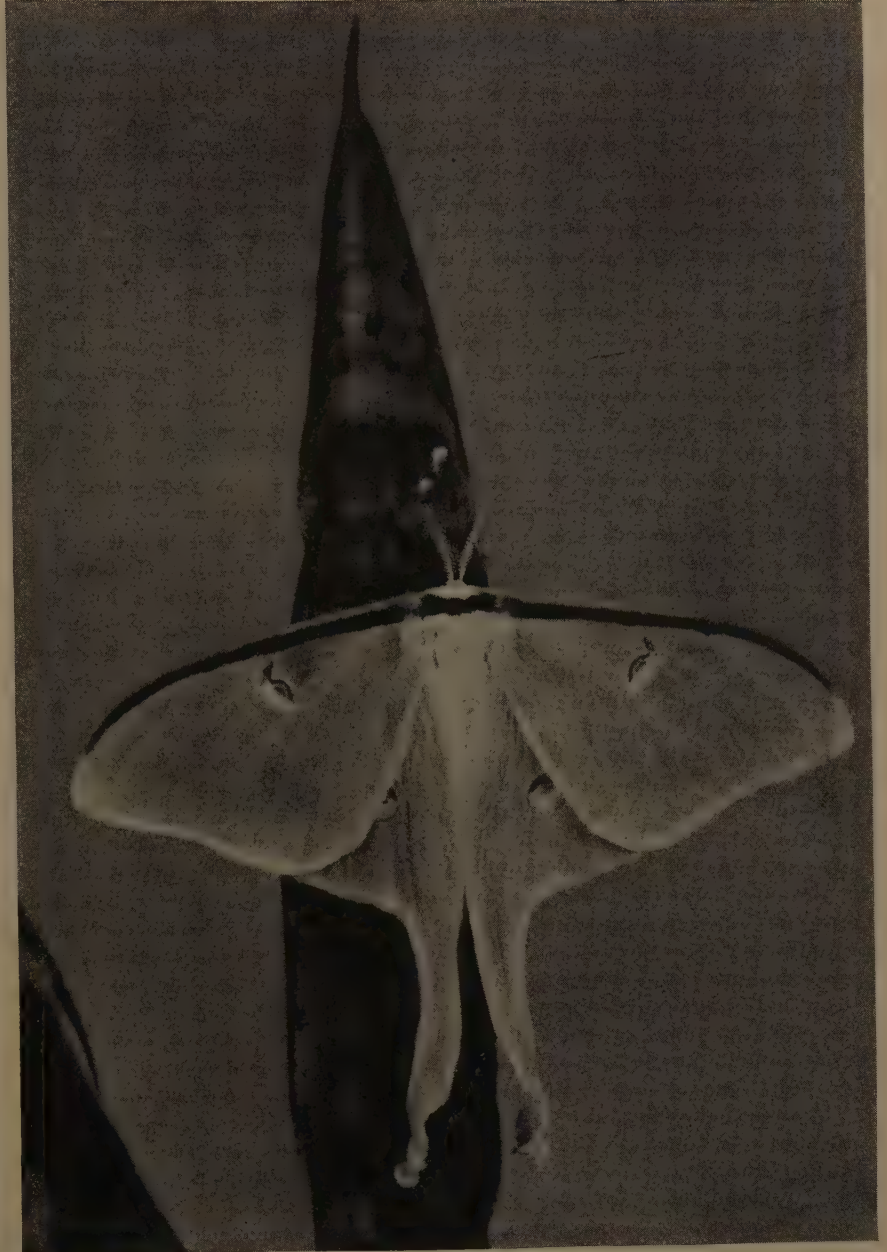


Now successfully out of the cocoon the luna moth rests as its moist and folded wings gradually dry and start to open. Note the imitation eyes on the wings as they unfold

the luna's head, crossed by a ruddy brown band of feathery scales, which we later recognized as the dark line extending from wing-tip to wing-tip.

So excited were we by the phenomenon before us that we almost failed at this point to click the shutter of our waiting camera! As the emergence grew imminent we gently fastened the cocoon to a stiff, spiked leaf to approximate natural conditions and provide a convenient perch for the moth. We had hardly made this change when two golden antennae came forth and the reddish brown front legs. With fingers trembling in excitement

and haste, we managed to click the second picture, and none too soon for the next instant our arriving guest was scrambling out of the cocoon and up the spiked leaf. Even before we could recharge the camera, the crumpled wings started expanding. The first picture of the luna moth after emergence was taken about ten minutes after its golden antennae appeared. After that the series shows the change at ten minute intervals, with the final portrait of a perfect, full-fledged moth photographed exactly sixty minutes after her ignominious emergence through an exit which was less than one half inch in diameter!



Here the moth is rapidly approaching its final unfoldment, and, then, the full loveliness of the moth with its trailing wing ends. It took sixty minutes from first to last

So exquisite was this lovely creature, whose gossamer wings had unfurled before our eyes, that she seemed more like a rare, exotic blossom than an insect! Then inspiration dawned. How fitting that this luna should grace the pink snap-dragons in the picture we had been preparing to photograph in natural colors. Amazingly, her very presence on the dainty flowers made them seem even more beautiful.

As evening drew near, our honored and much photographed insect guest grew restless and fluttered at the window that held her captive. Her coming had brought too much of joy and beauty into our lives that we should

thwart her leaving; so two reverent children enticed her upon the very spray of pink snap-dragons she had honored in a color picture and bore her gently into the fragrant garden where she belonged. A warm breeze fluttered the poised wings and the blossoms and lifted with it, as it passed, our treasured luna, eager to take her first flight.

In silence we watched the heavenly creature quiver with the realization of her freedom, then circle ecstatically free, higher and higher. For one brief second we saw her fleeting form silhouetted against the pale, full moon and then she was gone, leaving us richer in experience and delight for having known her and seen her unfold.

• • •

By this time there can be no doubt as to the authorship of the front cover of this issue. It is the work of Fess and Marion Haller. Also, it is the first reproduction of a color photograph as a cover of Nature Magazine. We hope that you like it.

MAGGIE AND JIGGS

BY DR. MAURICE
FORWALTER

• • •



IT WAS a cold and rainy December evening. The warm fire at home was cosy and I certainly was not enthusiastic about an emergency call to my office. But I went. The emergency was Maggie and Jiggs, as they came to be called, a living, two-headed, six-legged turtle. They came originally from a small Texas stream, where they were found by a tourist camper, and travelled widely before they came to my Van Wert, Ohio, office.

Both heads are normal in size and function. All six feet are normal. The tail is forked. At times Maggie and Jiggs both think alike, and then only do they move in harmony. Then again Maggie thinks differently than Jiggs and of course the turtle moves in the direction of the stronger. Usually both heads eat at the same time. They will take food either above or under water. They eat about every other day. Their food consists of hamburger and, unlike most turtles, they eat only fresh meat.

After much correspondence I found a scientific article on two-headed turtles. This article proved to me the rarity of this living two-headed turtle. All previously known two-headed turtles have been short lived. Most have been ill-looking monstrosities that have been most unpleasant to the eye.

I was interested to know whether the turtle had two

stomachs, but I was afraid to feed it the usual barium meal that is used for X-ray work on digestive tracts of human beings. I purchased an ordinary single-headed green turtle and fed it barium in its hamburger. This turtle suffered no ill effects. I X-rayed and found its stomach readily discernible in the negative. I then chose a time when both Maggie and Jiggs were hungry. I fed both heads the hamburger and barium. The negative proved the existence of but one stomach. Necessarily the stomach had two openings, one from each gullet. The rest of the digestive tract was normal.

Maggie and Jiggs sleep most of the time. In cool weather they will lie in the palm of your hand and fall asleep. They have never offered to bite. When hungry they will really watch your approach to the aquarium. They have learned that they obtain food from an extended hand. We have definitely proven that one head knows when the other is eating.

The authorities say that a two-headed turtle is short lived. I think, because of their unusual relationship, that Maggie and Jiggs will disprove their theory. It would appear that they have many years ahead of them. They are growing slowly and appear livelier every week, and are among Ripley's curiosities at the Chicago Exposition.

• • •

THIS species of mushroom, the *Coprinus atramentarius*, commonly called the inky cap, is one of the edible varieties and, as a rule, comes up in clumps or groups. This clump numbered more than a hundred, ranging in size from six inches in diameter to tiny buttons. They were found growing in the village of Oberlin, Ohio, in a parkway



which had been filled and graded the previous spring. The picture was taken by Frank T. Cooke in November, after which the mushrooms were served on menus of several tables during the following few days.

Those ignorant of mushrooms, however, should not purchase them from any casual salesman without knowing the exact species.

A HAPPY COMMUNITY

A STUDY OF ANIMAL RELATIONS ON A WILD LIFE SANCTUARY

BY H. M. WIGHT

PHOTOGRAPHS, UNLESS OTHERWISE CREDITED, BY THE
AUTHOR

WHY should the really beautiful relations in Nature be overlooked and neglected by students of wild life in their enthusiasm to emphasize the element of terrific and constant strife? Must we believe that life is but a struggle for existence? The cheerful and playful spirit of our animal neighbors suggests a more pleasing purpose in life.

The very nature of life makes death inevitable, and many wild creatures are destined, as are men, to kill or starve. But this inevitable strife is not the entire story. One has but to make a casual examination of the daily activity of any animal to realize that life in the wild is really a complex of reactions to various stimuli, and the dominant emotions observed in any area where many different animals dwell do not indicate a life in which strife predominates. Apparently the grasshopper does not hide in trembling fear from the approaching bird; nor does the mouse during his nocturnal wanderings anticipate at every step the approach of the weasel or owl. For the most part, death comes as a bolt of lightning, and is it not more humane than long exposure of the sick or weak to adverse weather or starvation?

The writer has recently had an unusual opportunity to observe the varied interrelations among wild animals in the course of a study to learn by observation the nature of the life lived by the various groups of animals in order that man might more intelligently manage areas as game refuges, wild life sanctuaries, or preserves. The result of



THERE WERE MANY RACCOON TREES

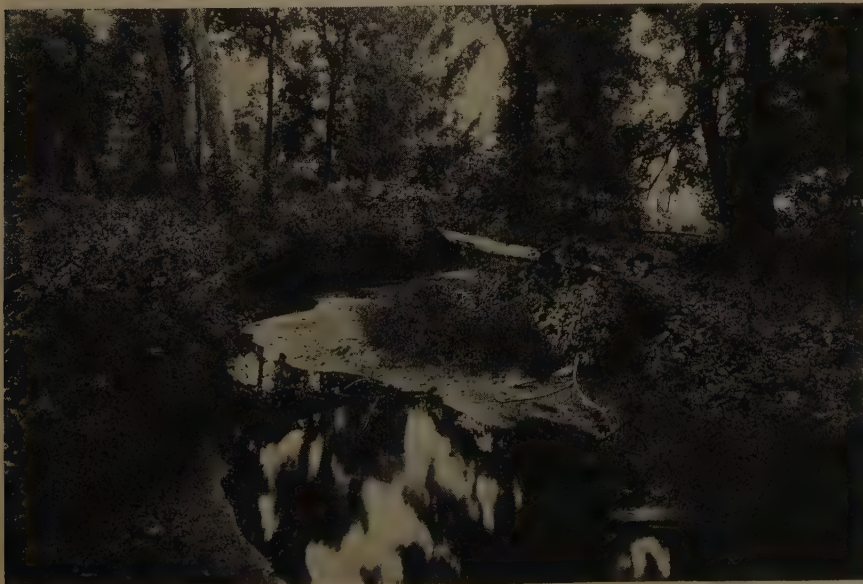
Yet the occupants of these homes did not seem to upset the balance of life

three years of intensive study has led him to change radically his personal opinion regarding wild life interrelations.

The area under observation consisted of approximately two thousand acres of land surrounding a six-hundred-acre wild life sanctuary. Five groups of animals have been given particular consideration: namely, game birds and mammals, predatory birds and mammals, rodents, song birds and insects, which must be considered constantly either as food for or as competitors of the other animals.

Hawks and owls nested within the area, and weasel and mink dens were located there, as were the dens of many skunks and woodchucks. Cottontail rabbits and

mice were common in suitable places, and song birds were found everywhere. Thirty pheasant nests were located on the area in one year, and approximately two hundred pheasants have wintered there each year. Many raccoon trees were located, and twenty-four muskrat houses can be counted in one small marsh. Dogs frequented the area at all times, and nearly all of the farmhouses harbored one or more cats. This area proved to be an



A CORNER OF THE WOODLOT

A beautiful stream ran through this part of the sanctuary, supporting a varied life

excellent setting for an examination of the interrelations that actually exist.

One community especially deserves mention. It consists of a ten-acre woodlot of mixed beech, maple, and basswood, through which a small stream runs. This woodlot had several occupied skunk and woodchuck dens, three raccoon trees were in continual use, and weasels were abundant. Nearby were three mink dens, while muskrats used the banks of the stream constantly. Red squirrel, fox squirrel, and chipmunks were represented, and both white-footed and meadow mice were common. A pair of red-shouldered hawks successfully raised their young in a beech tree, while only one hundred yards away a family of crows was also reared. Screech owls and barred owls frequented the woods, and a big blue heron often came to rest in a dead basswood tree and daily fed from the stream. The smaller birds included nuthatches, titmice, downy and red-headed woodpeckers, flickers, blue jays, bluebirds, indigo buntings, several species of sparrows, cardinals, towhees, cuckoos, and many others.

The conduct of the red-shouldered hawks has been most favorable as determined through the hours spent on the area under concealment. Never once were they observed to take or worry a mammal or bird in these woods. Many observations were made upon the parent hawks as they returned to feed their young. At such times the chorus of loud calls resulted

in only a momentary silence among the denizens of the woods, then the other birds and mammals went about their usual activities as though unaware of the presence of the hawks. The only noticeable effect possibly caused by the hawks was upon the pheasant and quail, which during the previous year had spent considerable time in the cool shade of the woods during the hot hours of the day. They were not observed in these woods throughout the second summer, and it was concluded that the hawk's presence influenced this change; but during the third year, although a family of hawks was again present, both pheasants and quail frequented the woods and successfully reared their young within and about it. Although the addition of these raptors to the association must have

affected the local population, the effect was not sufficient to be noticeable and the nesting birds and mammals maintained their numbers and appeared to retain excellent morale.

Attention was given during this study to the habits of the skunk in relation to the ground nesting birds. In one instance two hen pheasants brooded their respective young successfully in the same field of clover and close to the den where a mother skunk just as successfully reared her young.

In a deserted field over which two marsh hawks hunted repeatedly, a hen pheasant raised seven young to maturity near two skunk dens and a weasel den. On several occasions tracks followed in light snow through the marsh leading to pheasant roosts showed that a weasel had passed by to one side without disturbing the birds. A mink track was followed repeatedly along the bank of the creek within thirty feet of pheasant roosts. On one occasion the mink passed among the roosting sites with no apparent attempt to molest the birds and certain evidence showed that the animal was in pursuit of mice. Once a cock pheasant was observed so bur-



PHOTOGRAPH BY PAUL DALKE
YOUNG MARSH HAWKS ON NEST
Their parents hunted the region without reducing the family of a pheasant nearby



THE PHEASANT ON PARADE

A family was raised to maturity in close proximity to a weasel den and two skunk dens

dened by a huge ice ball frozen to his tail that he could not move about readily. In spite of this handicap he was not injured although mink passed near him repeatedly. Tracks in the snow fully demonstrated that the pheasant and mink were in close proximity at a time when the mink could have taken the bird, and that the roosting pheasants mentioned above had successfully spent the night unmolested was readily ascertained by the tracks which gave evidence that the pheasants had left their roosts in a leisurely normal manner. Repeated examination of roosting sites has not yet given evidence that a bobwhite or a pheasant has been killed on the roost. Only one dead pheasant has been found on this sanctuary that would give any information regarding the nature of death. This bird had evidently fallen while in flight as the body mark was conspicuous in the snow. It had been partly eaten by a crow, and crow tracks alone were found about it. The evidence indicated that its fall was due to injury by a telephone wire or some other obstacle. Mice and insects have been found to be the normal diet of the majority of the predatory birds and mammals, although cottontails are frequently taken by the hawks.

Very common but little discussed beneficial interrelations may really become exceedingly important factors in the life of an animal during severe climatic conditions, or during the critical breeding period. Such interrelations are found daily, and their importance may be illustrated by a few observations dealing chiefly with the ring-necked pheasant, which received considerably more attention than the other species.

While the pheasant has demonstrated most remarkable powers of adapting itself to new conditions, nevertheless it meets with difficulty certain of its physiological demands during adverse periods. As simple a requirement as a dust bath is not always readily obtained and especially is this true during the confining hours of almost constantly hovering a clutch of eggs. The hen pheasant

nesting in a clover field does not always find a soft dust bath in the immediate vicinity of her nest during late June or July. So it must be with keen appreciation emanating directly from the bottom of an avian soul that she finds a bath freshly prepared by some friendly mole only a few steps from her nest.

The pheasant, as would be expected, seems to demand green food at all times of the year. During the winter when green grass is not readily available, the birds seek the base of trees for bare ground where they obtain both grass and gravel, but when the snow becomes deeper, two groups of animals especially assist this most versatile bird. The ant mounds, which throughout the summer

provided the ever ready lunch counter and which furnished a resting place for the pheasant during the long drizzling spring and summer rains, once more are of assistance and frequently provide the only places where green grass and grit are accessible. Other benefactors are the cottontails and the squirrels, for these animals by pawing away the snow leave numerous spots of green grass that are eagerly utilized by the pheasant. It seems probable that pupating or dormant insects may also be supplied to the pheasant in this way.

During the winter months when food is especially difficult to obtain, many interesting interrelations are exhibited by the species of wild life that seek sustenance in the cornfields. On one occasion the writer observed several pheasants, which ran from



RED-SHOULDERED HAWKS WERE THERE

Never once were they observed to take or worry a mammal or bird living in the sanctuary



THERE WERE MANY SKUNKS PRESENT

Special study was given to their relation to the ground-nesting birds

a thicket to a hawthorn a few rods from the stream bank, apparently attracted by some particularly enticing object. Then occurred a drama that proved tragic only to the lone fox squirrel who sat in the hawthorn and scolded constantly and made threatening gestures to come down and clean up the entire bunch of cocky feathered neighbors who were consuming the much prized ear of corn that he had retrieved from the field on a far away hill. This incident seemed at first to be of little consequence, but careful scrutiny revealed that it was not in the least unusual, for soon two fox squirrels and seven red squirrels were found carrying corn back to the woods for winter consumption, carefully caching it in a variety of places. In this way many pheasants were provided heat-producing food to carry them over an adverse period, caused by a sudden storm when much of their natural food was covered up.

Later, while we were traveling through this same locality, a flock of twelve bobwhites was observed scampering from tree to tree, spending a few minutes beneath each. It was impossible to reach them directly because of an intervening creek, but their tracks were found later and a careful check was made on their activity. They were feeding upon particles of corn and nut meats that

had been dropped by the squirrels from their perch above. Sixty-nine trees had been visited apparently in rapid succession with varying success. This seems to be a very common relationship between bobwhite and squirrels which is shared by the pheasants, except that the pheasants seem to demonstrate more good bird sense and do not make a search beneath every tree but go directly to such trees as actually produce results. Whether this ability to locate the trees was based upon memory or was due to the presence of the squirrels has not been ascertained.

This habit of squirrels to rifle cornfields may play an important rôle in bird economy and it is interesting that

the farmers generally seem to follow their activity with the enthusiasm of the naturalist, a spirit not demonstrated toward the crow.

In the cornfield other relations occur. Frequently ears of corn which are frozen in the ice, where even the pheasant with its powerful beak has trouble in dislodging

them, are found and loosened by mice, cottontails, or squirrels so that the birds which follow them can readily take the kernels. During ice storms, which prove to be particularly hazardous to game species, weed and grain seeds are likewise made available.

A frozen button bush and rose swamp was investigated on this area, where both cottontails and pheasants were feeding on the rose. Rose hips were being taken in great numbers by the pheasant. This species of rose is so tall that normally the fruiting stalk rises well out of reach of the pheasant; but an examination of the young shoots that were being cut by the cottontails suggested that this pruning would cause it to become a lower branching plant, and a careful study demonstrated this to be true. Thus the cottontails can actually be considered the pheasants' horticulturist, just as the aphids are considered the ants' dairy.

Many pheasants and bobwhite find their food

already harvested for them. Chickadees were found scattering sumac in quantities and pheasants were noticed to have apparently eaten seeds from sumac bushes that had actually been completely cut down by the cottontails, thereby rendering food available that was normally far out of their reach.

The interrelation between the arboreal species of birds and mammals and the terrestrial forms might, if accurately and intensively studied, be surprisingly important.

A highly adaptive species in a dynamic environment can probably be studied indefinitely without exhausting either the material or interest. To illustrate that every trip into the field yields some new (Continued on page 88)



A BABY OF THE COTTONTAILS

These rabbits managed to survive on the sanctuary despite the presence of many of their accredited enemies, and bobwhites reared their broods with equal success despite predators





A CONEY IS TELLING THE WORLD WHAT HE THINKS OF STRANGERS

A comical, round, furry face, garnished by a pair of equally round ears, is peeking over a rocky edge with much inquisitive wiggling of nose and with many "eeks"

SIERRA TWILIGHT

BY A. BRAZIER HOWELL

ILLUSTRATED BY R. BRUCE HORSFALL

LOW over the jagged crest of the Mono escarpment rearing its great backbone far above timberline, fluffs of cloud raced in sedate procession, their snowy whiteness in vivid contrast to the cobalt of the Sierran skies. Thus daily blew the gale from the west, sucked in by the rising heat of the arid lowlands farther east, but passing high above the marquise setting of the seven lake gems nestling among the lithe pines of the old glacial bed upon the flank of the mountains.

A land of enchantment this, and of romance as well. Enchantment because those who are in tune with the Sierran infinities and have been admitted through understanding to share her many moods return again and again to a favorite alpine association. Romantic because here and there, tucked away in spots secluded by encroaching forest, are crumbling log cabins with sagging roofs, like ancient men huddled in a shady corner and brooding upon past greatness. Silent relics all of a time long dead

when this was a busy mining camp of five thousand souls. One may still trace out old roads and trails and muse upon the hopes and disappointments of strong men long gone who gave life to this forgotten remnant of the old West. In a land that is all activity and progress, though, a bit of civilization, however crude, which has been completely reclaimed by the wilderness, its scars healed by the touch of growing things, is more refreshing than otherwise.

Now the chipmunk is sole proprietor, and his name is legion, scurrying before me or pausing in the hunt for green nuts from the tips of hazel brush to scold in querulous tones as I shift my pack and start for the upper end of the largest of the seven lakes. It is still in the forest, the sunshine checkering at my feet and the air heavy with the incense of warm pines. Fascinating streamlets tumble across the trail and I wonder why we have never learned to call them burns, a name much more picturesque.

The way grows steep and I mount with the ranks of the white firs, picking a trail up the talus slope at the foot of the cliffs. Huge blocks of granite are flung about. Everywhere are tinkling rills with a tiny border of verdure—orchis, paint brushes, and the beautiful cream and blue columbines transported long ago from the Rockies by the birds.

There is no song of birds here but I know where to find the small people of the high country. Having earned a pipe, a rest, and a bit of entertainment, I stop at the most populous spot of this altitude—a great rock slide capped by a snow bank and with its feet tucked beneath a blanket of lush meadow. No little shale slip this but a stony chaos of noble proportions built of sharp granite. Stretching flat upon one of the blocks and facing uphill I puff in peace. I locate a wisp of hay in the lee of a boulder, denoting the mow of one of the little people, gleaned with infinite patience and palpitating trepidation from the insecurity of the open meadow. I have not long to wait before a comical, round, furry face, garnished by a pair of equally round ears, is peeking at me over a rocky edge, with much inquisitive wiggling of nose and with many "eeks" to the time of staccato jerks, and a coney is telling the world what he thinks of strangers. Motionless reconnoiter brings to light four other conies, all busily engaged in mimicking the first, and far up the slide the extreme top of a cautious

old buck marmot cannily melts backward at my first movement. And after a bit of poking about a few sticks and a characteristic odor proclaim the home of a pack rat hidden far below.

A good rock slide is a tenement, attracting conies, a community of rats, chipmunks and copper-headed squirrels, a few marmots, and to prey upon these, weasels and martens. Yes, the beautiful marten is still there and I have caught them among the slides.

Soon I leave the forest behind and come to a land all of

granite and gnarled, ancient, white-barked pines, that hardy pioneer that wrests a meager living from the crevices between the boulders and strains slantingly away from the windy cliffs. A land of bitter gales, and I shiver in my lowland attire. The sun has long since gone west over the crest but shines bright and warm far below down Long Valley and on the thunderhead rising over Nevada way.

A huge snow bank rests in a small cirque, its foot of clear, blue ice. From it have broken miniature icebergs now floating in a tiny lake. Where a streamlet pitches downhill are dwarf willows only just released from the snow and now, in mid-August, beginning to burst bravely

into leaf. Beside them is the fresh-dug mound of a mountain pocket gopher and many old earthen cores with which it plugged snow tunnels the previous winter.

I make a hurried trip down hill to gather a store of dead pine, each two inch limb representing the effort of perhaps one hundred short, gale-bitten summers. A flicker of fire is quickly kindled and with my pair of blankets about my shoulders and a rock at my back I eat my single handful of food. Contentment! The sun is fading from the tips of the Nevada mountains eighty miles away. The thunderhead is dissolving to the south and below me night is drawing a blanket over the meadowlands in Long Valley. Nearer, the dim carpet of pines is a blur, while the waters of the



THE CHIPMUNK IS SOLE PROPRIETOR

His name is legion, scurrying before me or pausing in the hunt for green nuts

seven jewels give back to me the paleness of the evening sky.

Absolute stillness, the hush even intensified by the perpetual flow of the winds over the escarpment above, felt rather than heard. All about, the arctic. The forbidding granite, the miniature glacier with its tiny berg children, the gopher grubbing in the icy ground and safe under its blanket of snow for ten months of the year, the brave little willows snatching at two months of chilly summer, civilization non-existent. Contentment.

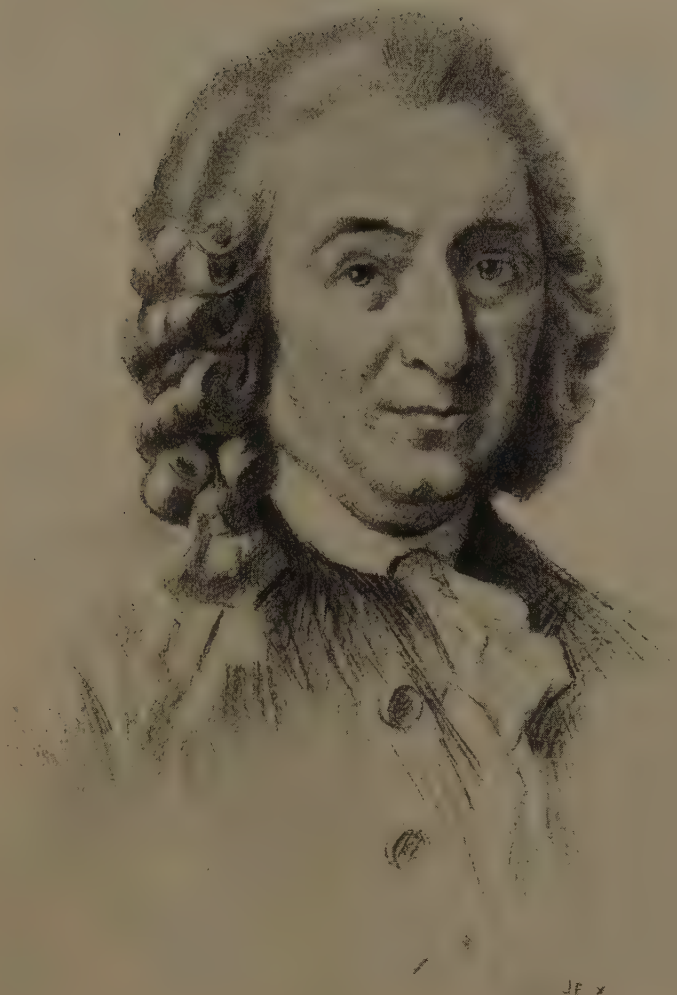
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Among the features to appear in the September issue of Nature Magazine are several of outstanding interest. One is the story of that amazing beast, the duck-billed platypus. Another is about mushrooms that may easily be recognized, gathered and eaten. The gardening possibilities in late summer and fall are treated by Romaine B. Ware in a special article. Fay Welch advises the canoeist on his equipment in another article in the camping series. These are only four of the interesting and permanently valuable articles next month.

LINNAEUS— THE LITTLE BOTANIST

BY DONALD CULROSS
PEATTIE

ILLUSTRATED BY JEX



IN THE prim little old-fashioned Swedish garden of the country rectory at Rashult, two hundred and twenty-two years ago, a little boy of four stood crying because he could not remember the name of one of the flowers. His big, kind father, Nils, pretending to be very angry, was threatening not to teach the child any more flower names if he could not recall this one, and the child, who believed him literally, was broken-hearted at the thought. But presently he thought of the word, and was happy again and ran about among the stocks and wall flowers and aconites, touching them and naming them. And that is how Karl Linnaeus came to be known as "the little botanist"—Karl, who was to grow up into the Big, the Great Botanist, the greatest, in many ways, that ever lived.

Karl's mother, Christina, was a minister's daughter, and it was her will, and a very inflexible will she had, that her son should enter the church. She did not encourage his passion for "useless" things like flowers and animals, but sent him off to school to study for the ministry. There he was kept for many years at great sacrifice by his poor parents, and at the end of that time he had made no progress except in Latin and Greek. In those days education was considered to consist of languages, literature and religion. Science was merely a freakish pastime of some individuals. Consequently Karl's teachers sent him back to his father as being too stupid to learn anything, and advised he be set to learn a trade, such as tailoring or shoemaking.

But a country doctor who had a leaning toward natural sciences was interested in young Karl and recommended that the boy be sent away to become a doctor. Frau Linnaeus was satisfied when she learned that he

could make as much money in medicine as in the ministry, and so back young Linnaeus went to school, and soon entered Sweden's greatest university at Upsala. There were then no courses in botany, which was considered a trivial subject and only touched on by the same professor who taught medicine, physics, anatomy, zoology and many other sciences. In fact Linnaeus never had a real lesson in botany in his life, but spent every spare moment of his time rambling the fields outside the old college town, studying all the plants and birds he could find. He tramped the woods until his shoes wore out, and having no money to resole them, he filled the bottoms with paper.

A great fire had recently destroyed part of the university and the botanical garden had suffered heavily. There was no money to remake it, so it was allowed to go to pieces. It was a big, untidy place, where only about two hundred different sorts of plants still struggled against neglect and the hard Swedish winters. To the garden one day came, for rest and refreshment, Dr. Olaf Celsius, professor of theology, who all his life had longed to be a botanist. Among the ruins of the garden he saw a lanky, earnest boy in frayed clothes drawing plants,

examining them under a little lens, and scribbling notes about them in his notebook. Surprised to find anybody who cared about these "weeds", Celsius spoke to the lad, found him already a sage in botanical lore, took him home, gave him the run of his great library and his private collection of plant specimens, and from time to time advanced him in the favor of the authorities of the university. He also took the boy into his house and gave him board and lodging.

And so bit by bit the young man rose in the world, substituting in scientific lectures for old professors, bringing the botanical garden back to life, and winning favor with the regents of his university. At last he was able to persuade them to send him on a great expedition to Lapland, a country then as now but little known; a wild beautiful land where the snows lingered almost to June, where the people were scarcely Christianized, and where the brief and beautiful summer held unlimited promise for the young naturalist, then twenty-five years old.

Mounted on his horse, Linnaeus started north on the twenty-second of May. "It was," he says, "a splendid spring day; the sky was clear and warm, while the west wind refreshed one with delicious breath. The winter rye stood six inches high and the barley had newly come into leaf. The birch was beginning to shoot and all trees were leafing except the elm and aspen. Though only a few spring flowers were in bloom it was obvious that the whole land was smiling with the coming of spring. The lark sang in the sky."

In a certain sense this journey was more than a mere journey to Lapland; the delight and optimism and freshness of Linnaeus's style is more than a literary rapture. It was, in a way, the first journey of its sort in the world, the first since the Greeks and Romans, at least. For one thousand five hundred years the natural sciences had been confined to stuffy rooms, between the covers of old tomes, in the long-winded, theoretical arguments of learned old monks who never left their monastic walls. A few great medieval minds had made some progress in botany and zoology by sheer dint of intellectual power. Linnaeus was one of the first, perhaps the very first, to whom it occurred to take a great trip to Nature itself. He scarcely knew enough Greek to read what Aristotle had discovered about plants and animals, and it was a lucky thing, because his ignorance of book-learning sent him to the fields to find out for himself. In that way he was the first of the moderns in science.

Many were his adventures in Lapland. On several occasions he nearly lost his life. He was often close to drowning, to starving, to being lost in blizzards in the mountains of Norway. But he had daring and the strength of youth, and unlike other travelers of his time (and here again he was the first modern) he traveled light. His equipment was all carried in a leather saddlebag and contained "two pairs of false sleeves, one extra shirt, an inkstand, microscope, spying glass, gauze cap for protection from gnats, comb, papers for drying plant specimens, and notebook." He also had a long measur-

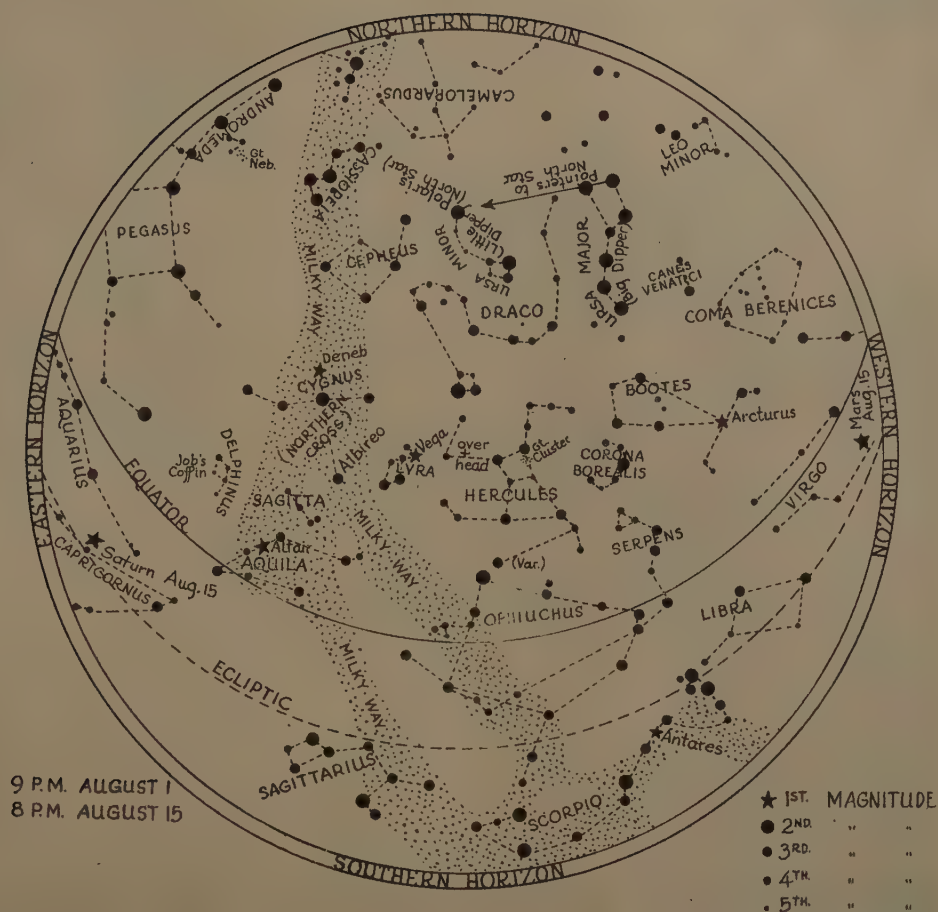
ing stick and a small gun. Surely his wants were few.

All his bird specimens were washed off a raft in a rapid. But he saved his journal (now one of the most precious manuscripts in the world) before a wave took it off. Here and there a kind woman mothered him, or a minister gave him a letter to some friend farther on, and so at last he completed the great journey, the first scientific expedition since classic times, and set the fashion for real Nature study.

The young man, by his writings, was now beginning to be known outside his native country. The idea that plants had sex, that there were male and female flowers, was then new to science, and this idea he elaborated until he had built up a great system for classifying plants into related groups. Previously plants and animals were considered to be unrelated to each other. They were called by long Latin names, containing sometimes fifteen or twenty words, and these names did not give any clue to their relationships. Linnaeus, who was never long-winded, condensed their names into two words. Just as a man has two names, as John Smith, one of which designates the family, the other the individual, so did Linnaeus's nomenclature give each creature a family and a specific name. Thus the skylark that he loved so Linnaeus named *Alauda arvensis*, and all other larks are some species of *Alauda*. So Linnaeus set the standard for the students of all groups of animals, and today thousands of creatures of all classes, the world over, bear the names given them by the boy whose teachers thought he was too dull to learn.

The marvelous new system, which has clarified all science ever since, was a blow to the petty minds of the scholars of his time, who loved guesswork and obscurity and wrangles over the meaning of a Latin phrase in Pliny's *Natural History* better than the advancement of real knowledge. When Linnaeus went to England he was coldly received by Dillenius, botany professor at Oxford. "There goes the man," said Dillenius of him, "who is ruining the science of botany." But when Linnaeus showed Dillenius that he could identify a strange new flower by his system, whereas Dillenius could never name it unless he could find it described by Pliny, Dillenius was so impressed that he offered Linnaeus half his own salary if he would come and share his professorship with him.

Linnaeus did not accept the offer, but from then on his became the greatest scientific name of his age. We see him last in his old age, an apple-cheeked old man surrounded by the hosts of his enthusiastic students as they went to the meadows and fells to collect plants, the students waving banners and playing flutes and shouting, "Vivat Linnaeus!" If this sounds today more like a picnic than a field trip of a class in botany, let us remember that Linnaeus was the author of one hundred and eighty books, that his students and the men he influenced developed, many of them, into the greatest scientists of all time. If a teacher as inspiring could be found today, no one would object to his life-long habit of mixing innocent play with his great work.



To use this map hold it before you in a vertical position and turn it until the direction of the compass that you wish to face is at the bottom. Then below the center of the map, which is the point overhead, will be seen the constellations visible in that part of the heavens. It will not be necessary to turn the map if the direction faced is south.

ARCTURUS—A REMARKABLE STAR

BY ISABEL M. LEWIS

ARCTURUS, the reddish-yellow star that shines so brilliantly these midsummer evenings in the western sky, has been very much in the public eye this summer. It soared into prominence in late May when its light fell upon photoelectric cells at the eye-end of telescopes at four observatories and furnished the energy which, amplified and transmitted over telegraph lines to the Century of Progress Exposition grounds in Chicago, threw the switches which opened the doors to the science exhibits and turned on millions of incandescent lights that formally opened the Exposition. Arcturus was chosen for this purpose instead of, possibly, its brilliant rival, Vega, because its distance from the earth is approximately forty light years. Thus the rays of light which caused the illumination of the Exposition on its opening night started on their journey toward the earth during the World's Fair of forty years ago.

Boötes, the kite-shaped constellation in which Arc-

turus occupies a conspicuous position at the base, with streamers of faint stars extending in opposite directions, is supposed to represent the Driver of Asterion and Chara, The Hunting Dogs, in their pursuit of Ursa Major, the Bear, around the Pole. In ancient times the name Arcturus was frequently applied to the entire constellation of Boötes and it was also one of the early titles of Ursa Major. It is used with this meaning in the Book of Job, the Revised Version of which substitutes "the Bear" for Arcturus in the familiar quotation "Canst thou guide Arcturus with his sons?"

Arcturus has been an object of admiration to mankind from the earliest days of recorded history, and was one of the first stars to be named. References to it are frequent from the days of Hesiod to the present time. Astrologers, of course, made much of its reputed influence, which seems to have been dreaded, particularly by seamen, although it was supposed to bring honor and riches

to those born under its influence. Astronomically it was always, and is today, a star of special interest. It is said to have been the first star to be observed in the daytime with a telescope, this as early as 1635. It is also on record that it has been seen with the naked eye twenty-four minutes before sunset. On Oct. 5, 1858, Arcturus shone with spectacular brilliancy through Donati's Comet at a distance of less than the diameter of the moon from the nucleus of the comet. According to R. H. Allen, in *Star-Names and their Meanings*, the same thing was observed 240 years before, in the year 1618, because a certain John Bainbridge, "Doctor of Physicke", wrote of the comet of that year "The 27th of November, in the morning, the comet's hair was spread over the faire starre Arcturus betwixt the thighs of Arctophylax, or Bootes."

Modern astronomy, in command of so many powerful instruments of research, can tell us many wonderful facts about this star, some of which were unknown even to astronomers of less than fifty years ago.

Arcturus is a giant star, not, to be sure, a super-giant such as Mira, Antares, Rigel, Canopus, or Deneb Cygni, but still quite a fair-sized giant with a diameter thirty times that of the sun, or about twenty-six million miles. It is what is known as a K-type star; that is, it is a comparatively cool star, with a surface temperature of about 4100 degrees C. as compared with 6000 degrees C. for our own sun. This is to be expected from its reddish-yellow or orange color; because the cooler the surface temperature of a star the more reddish it appears in color. A method is known, called the spectroscopic method, for determining the distance of a star by means of the relative intensity of certain lines in its spectrum. When this method was applied to the case of Arcturus, however, it was found that the results of this method were quite discordant with those obtained by the direct trigonometric method, as it is called, which placed the star at a distance of about forty light years from the earth and which should give very reliable results because of the nearness of the star. It was found that the apparently discordant results yielded by the spectroscopic method were explainable upon the assumption that Arcturus is one of those rare stars of peculiar type which are brighter than the average stars that show the same details of spectrum. It was evident that Arcturus was about three times as massive as the average star of its type and about eight times as massive as our own sun. In light-giving power it exceeds our sun one hundred times. That is, it would take one hundred suns as bright as our own to equal Arcturus in luminosity. The density of Arcturus is very low, however. The density of the sun is about one and four-tenths that of water. The density of Arcturus is about one-third that of air under standard conditions. At that its density is a thousand times greater than that of Antares, the super-giant red star, now visible in the southern sky.

Arcturus is also remarkable for its rapid motion through space, which amounts to about eighty-five miles per second. Since the days of Hipparchus, about 146 A.D., it has changed its position in the sky due to its

individual motion through space by more than a degree, or twice the diameter of the full moon. This motion is greatly in excess of the average motion of a star and is 500 times that of Rigel, in Orion, or Deneb Cygni, the star at the top of the Northern Cross, now visible high in the eastern evening sky. On the other hand, a faint double star more distant than Arcturus is speeding through space at the rate of 400 miles a second.

Vega, the diamond-like star in Lyra, now near the meridian about nine P. M. the first of August, and some distance northeast of Arcturus, is very slightly brighter than Arcturus, but the difference is so slight that it would take a skilled observer to detect it. These two stars, so different in color yet such close rivals in brightness, are decidedly brighter than Altair, Antares, or Spica, the three stars nearest to them in brightness, now visible in the evening sky.

The planet Saturn is now in fine position for observation. It is in the constellation of Capricornus and is in opposition to the sun on August 5. It then rises at sunset and is visible all night.

On August 17 there will be a remarkably close conjunction of Jupiter and Venus, even more interesting than the close conjunction of Jupiter and Mars on June 4 which attracted so much comment. At that time the angular distance between Jupiter and Mars was equal to about half the diameter of the moon. When Venus and Jupiter come into conjunction on August 17 they will be separated by a distance of only six minutes of arc, or a fifth the diameter of the moon. Four minutes of arc is the least distance between two stellar objects that can be distinguished with the naked eye and the distance between Venus and Jupiter at that time will be but little more than that amount. So these two planets, the brightest by far of all the planets at this time—though under certain conditions Mars may surpass Jupiter in brightness—will resemble a magnificent double star in the western evening sky shortly after sunset on August 16 and 17. Conjunction occurs at six o'clock on the morning of August 17 in Eastern Standard Time, when the two planets are not visible in the eastern states. Their relative positions will change considerably in half a day, as Venus is moving very rapidly. Only from the Pacific Ocean will the planets be seen at or near the time of conjunction. In the Pacific states they will be seen nearest to each other on the evening of August 16. Although apparently so close together, Venus will then be about 128,000,000 miles from the earth and Jupiter 583,000,000 miles.

Mars is now in Virgo and approaching the sun. It may be seen close to Spica on August 15 in the southwestern sky in the evening twilight. Mercury is not favorably placed for observation early in August. On August 17 it is at its greatest distance west of the sun and is then visible for a few days low in the eastern sky in the morning twilight.

There is to be an annular eclipse of the sun on August 21. It is not visible in this country, however. The path of the annulus, within which (Continued on page 90)



YES, THIS IS THE SAME OWL

At the left the long-eared owl in normal pose and at the right the owl in the picket-pin pose adopted as camouflage

AN OWL TURNS PICKET-PIN

BY HAMILTON M. LAING

PHOTOGRAPHS BY THE AUTHOR



ALMOST everyone who has crossed the western plains has been amused by the "picket-pin" pose of the ground squirrels that, sitting bolt upright, appear to be pegs driven into the sod. Not so many folk have seen an owl play at this pose yet there is one owl, the long-eared, *Asio wilsonianus*, that is quite good at it. The young especially make use of the trick; they pose so both in the nest and after they leave it and even the adults may be caught at it. Why?—A logical question; but after we have met this little owl in his home, the answer is easy. He is a bird of the shady places in the woods, especially a lover of big willow-clumps in ravines. The last year's crow's nest at low elevation is usually his chosen nest site. Thus he is seldom seen in full light and when he is sighted in his stretching pose, dimly, with his feathers compressed tightly to give him apparent added length, and even his tiny horns drawn up straight, he does not strike the eye as a living thing at all but

rather as a small stub or broken limb or a willow trunk.

Whatever the purpose served by this stretching it is a sight of the woods never to be forgotten. Once to discover whether a crow's nest was occupied I scrambled aloft and peered over the rim. The spectacle that was in front of my face was startling—a single little long-ear drawn to astounding length and made doubly comical by the wicked leer in his bright eye. It would seem that at sight or sound of danger the fuzzy youngster assumes this pose as naturally or instinctively as the grouse chick squats or the duckling swims.

To date it has been found impossible to get a photograph of the owl in a really good picket-pin pose. Always by the time the camera gets into play, the bird, being sure that he has been discovered, slowly subsides again. In the illustration herewith where he is shown on the nest, he has been caught on the retreat, telescoped back to about half the full extension of which he is capable.

PARTNERS OF THE FARMYARD

BY MRS. J. L. TOWNLEY

NEARLY fifty years ago, the story goes with every appearance of fact, two friends were walking along a country trail eating cherries. They stopped on a large rock to rest and one of them, perhaps from forethought or perhaps for want of anything else to do, stuffed some cherry pits in a crevice in the rock and packed earth about them and went his way. The next year, passing by, he noticed that the pit had sprouted. The struggle went on, the small courageous roots of the youthful choke-cherry tree battling for existence. Finally the rock gave in and formed a partnership in the farmyard in which it now rested. The rock split



as the tree grew and bore and branched, giving in return shade to the rock.

A road replaced the trail. Hamlets turned into cities. The partners found themselves on Highway No. 36 just east of Henning, Minnesota. For a moment they were threatened by the highway builders but their joint fame saved them. Now a new highway is projected but the rock and tree have many friends and together they may be moved from the line of the highway. They are worth saving, these friends of a half century. They have become a noted landmark testifying to the strength that is inherent even in the tiniest seed.

NATURE RAMBLES WITH UNCLE DICK

A DEPARTMENT FOR THE YOUNG FOLKS

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NATURE'S WINGED FLOWERS

BY GEORGE A. SMITH

PICTURES BY THE AUTHOR



THIS SPECIES IS COMMONLY KNOWN AS THE ZEBRA BUTTERFLY. IT HAS A LONGER TAIL THAN MOST OF ITS COUSINS



TIGER SWALLOW-TAIL IS MUCH LIKE ITS COUSIN ABOVE. IT IS YELLOW AND BLACK AND ITS LATIN NAME IS PAPILIO GLAUCUS

BELOW IS THE GREAT SPANGLED FRITILLARY OR ARGYNNIS CYBELE, WITH VARIOUS SHADES OF YELLOW AND BROWN, BLACK AND WHITE



DID you know that there are about seven hundred different kinds—or species—of butterflies in the United States? Well, there are. Just walk outdoors and keep your eyes open and you will surely see some of these beautiful winged flowers flitting about in the sunshine.

Scientists call butterflies Lepidoptera. That is a Latin word meaning scaly-winged. You see, the hairs that cover the wings of butterflies are flattened, or scale-like. And it is from these feathery scales that the butterflies get their lovely colors. Each tiny scale is delicately colored. Together they make up the designs that are seen on the wings of our butterflies.

When you go out into the fields in the summer it is fun to be able to point out a butterfly and say, "That is a monarch butterfly", or when one lights on a garden flower to announce, "See the lovely mourning cloak butterfly."

Here are ten of the more common butterflies that probably are to be found not far from your home right now. Of course they are not shown in color here, but the markings will give you a key to them. Then, perhaps, you have an insect book

SURELY YOU KNOW THIS ONE—THE MONARCH. YOU HAVE SEEN IT GATHER IN LARGE FLOCKS AT THE END OF SUMMER BEFORE IT FLIES AWAY. IT IS ORANGE AND BLACK WITH WHITE SPOTS





SPICE BUSH SWALLOWTAIL, BROWN SHADING INTO BLUE WITH YELLOW AND BLUE SPOTS



RED-SPOTTED PURPLE, A LOVELY COMBINATION OF BLACK, PALE BLUE OR GREEN WITH RED SPOTS

with colored pictures so that you can check up on your naming of this or that butterfly. If you haven't you will surely find one in your public library.

Have you ever watched a butterfly or a lovely moth come out of the cocoon in which it has slept all winter? It is a wonderful thing to see. Keep your eyes open in the outdoors this fall and see whether you can find a cocoon. Take it home and keep it in a cool place until next spring comes and then put it where it can be watched. By studying an insect book you may be able to find out what kind of a moth or butterfly is likely to come



THE RED ADMIRAL AND, BELOW, THE COMMON WOOD NYMPH



out of it. Or, perhaps, you would rather wait to be surprised. If you cannot find a cocoon, or live in the city, you can buy a cocoon. (Uncle Dick will be glad to tell readers where they can be bought.)

You will find it great fun keeping a list of the butterflies you have seen and have identified. You will be surprised to see how the list grows and to find out how many more you know than most people. And the moths, too, are often very beautiful, as well as many other insects that you haven't noticed before or thought much about. So just start with these ten and see what fun it opens up for you.

THE MOURNING CLOAK IS FAMILIAR TO ALL WHO KEEP THEIR EYES OPEN IN THE MEADOWS



THE VICEROY LOOKS MUCH LIKE THE MONARCH IN ITS COLOR AND ITS MARKINGS



CAMP COOKS AND COOKERY

(Continued from page 70)

lath across a strip of canvas. Then in camp the axman cuts and sets up a frame of four legs and two cross-pieces, and the roll of lath-enforced canvas makes the top.

A good kitchen outfit for four people comprises one Nugget grid with folding oven, one frying pan, one iron skillet about three or four inches deep, preferably with a cover to make a Dutch oven, one pot eight or nine inches in diameter and about eight inches deep, one smaller pot, and one coffee pot. Such an outfit, supplemented with plates, cups, bowls, knives, forks, spoons, can opener, dish-washing mop and dish towels, will put any camp cook in a position to cater to as many as half a dozen people. However, an excellent addition to this outfit is a couple of pans, three or four inches deep, useful for mixing dough or holding stewed fruits or vegetables. For use in high altitudes some campers go to the trouble of substituting for the large pot a pressure cooker. At an elevation of six thousand feet it takes a long time to cook anything by boiling, and there the pressure cooker is a great help. However, the old-timers, having no pressure cookers, merely had lids for all their pots and put a rock on top when necessary to get more heat. The camp cook can learn a great deal from Horace Kephart's book *Camping and Wood Craft*. He should learn something about the nutritive values of various foods adaptable to camp use and how to turn out a reasonably balanced diet. Even that old standby, *The Boston Cook Book*, furnishes to him useful information. He will learn that alternate rice and macaroni will compensate for the absence of potatoes, and that both of these dishes may be attractively and tastefully prepared with the addition of cheese or peanut butter. The camper's standbys among dried fruits are prunes and apricots, and indeed these two, stewed up together, seem to supplement each other's flavor. Dried apples may be used for pies or added to the other dried fruits. If we assume that one does not have the room to take along fresh fruits but does have the space for a few extra cans, there is nothing more generally popular with campers than canned grapefruit.

Meats, of course,—generally speaking—will not keep. The camper's standbys are bacon, ham, and corned beef. Boneless ham is put up in cans under the Hormel brand, and this, can and all, takes up less space than the average ham complete with its considerable bulk of bone. Corned beef makes good sandwiches for a hasty noon lunch, and it can be shredded and cooked with rice or macaroni. If we have the space, we should certainly take along some cans of jam and honey, for the sweet will be greatly appreciated. It makes the breakfast hot cakes into a delightful dish.

One has never truly camped until he has gone far enough away from the restaurant and the delicatessen to live pleasantly and healthfully on the simple but balanced menus which the good camp cook will set out. Nor let any mere man assume that cooking is exclusively a woman's job. It may be so at home, but that is all the more reason that, amid the joys of vacation time, she should be freed from her routine while someone else takes it upon himself to be-

come a good camp cook. Cookery is an art, varying in its excellence with the talent of the artist. It is a practical art—something to be proud of and never to regret—and yet, it is not difficult to learn.

A SIMPLE CAMP COOKING OUT-FIT SUITABLE FOR FOUR TO SIX PERSONS FOR AUTO-MOBILE, PACK HORSE, OR CANOE TRIP

Get a piece of $\frac{1}{8}$ inch plywood 4 feet square, also a $\frac{7}{8}$ inch pine board 8 inches wide and 5 feet long. This wood will be just adequate to make two boxes, each 2 feet long outside, 8 inches wide inside, and 15 inches deep. Use the $\frac{7}{8}$ inch pine for the ends. The boxes will pack better for horse travel if one side is incurved about $\frac{1}{2}$ inch in 15 inches to fit against the pack horse. Attach a lid with hinges. Buy $3\frac{1}{2}$ yards of 10-ounce canvas about 26 to 30 inches wide. Glue canvas onto boxes to strengthen, protect and waterproof them, leaving a small flap to protect the cracks where the lid opens. Paint the boxes after glue is dry. Attach cleats at the ends for lifting. These are your all-purpose cook boxes.

In one box pack coffee pot nested in next larger size pot, nested in turn in largest pot (used for dish washing), which can not be more than $7\frac{1}{2}$ inches deep, if one side of box is incurved, but may have a diameter of 12 inches or more. Two mixing bowls about 3 inches deep, two baking pans for oven, six cups with handles, arranged for nesting; six soup bowls, two small electric lamps (Boy Scout model), one dish mop, one metal egg-container with one dozen eggs and with the other half of container partitioned off to hold crackers or cookies, one can grapefruit, one can other fruit, a dozen slices of bacon, waterproof bags of flour (three or four cups), corn meal (one cup), sugar (two cups), Klim or powdered milk (one cup), salt (one cup), rice ($\frac{1}{2}$ cup), macaroni (one cup), coffee (one cup), one small jar of jam or marmalade, one onion for flavoring, two Knorr's soup rolls (sufficient for twelve cups soup), one box bouillon cubes (the addition of $\frac{1}{2}$ cube per person will help flavor and salt the vegetable soup), pepper and other spices. You may still have room for a little cheese. Place the dish towels on top.

In the other box pack a two-burner Kamp-Kook stove with feed tank inside. Also, pack inside the stove a pair of pliers for unscrewing the feed pump and for use as pot lifters; a syphon tube for filling the feed tank with gasoline; and there will be room for a can of beans and a small can of baking powder sealed with adhesive tape. Alongside the stove pack a folding Kamp-Kook oven, and a wire toasting grid or grill. (As a two-burner stove used also for baking has its limitations in the matter of capacity, it is assumed that an open fire may be used for cooking steaks and for toasting. This is where the grill comes in.) Alongside the oven pack a 10-inch frying pan with six plates inside (wrapped in paper). There will still be room for an egg-beater (necessary when using dried milk), a cake turner, pot-cleaner, canvas case with six knives, six forks, six spoons, two serv-

ing spoons. On top of this layer pack bread-knife, long-handled fork, folding wash basin and short trench shovel.

You now have everything needed for about three meals on a week-end camping trip, except perishables such as meat and butter, which may be carried in a small refrigerator box or thermos. Sometimes one may carry separately a few pre-boiled potatoes for quick use. On longer trips the two boxes supply not only the utensils but also two or three meals of food, which may be replenished from the main supplies carried in other boxes or duffel bags. When traveling by canoe or horse, one may take out and leave behind the gasoline stove, substituting therefor a Nugget grid with sheet metal sides for wood-fire cooking, and an iron Dutch oven or light Reflector oven. Systematized packing of camping needs saves time and space and renders easy getting ready for the next move.

A HAPPY COMMUNITY

(Continued from page 78)

and interesting interrelation, one further observation may be mentioned.

The snow was very deep and the day had been intensely cold, and it was only with a final effort based upon absolute confidence that every minute spent in the field would yield valuable information that a visit was made to a mass of burdock. This special effort was well recompensed, for approximately twenty pheasants were flushed from the vicinity of this well-protected bunch of burdock surrounded by a tangle of grapevines and cherry trees. Pheasant tracks led directly to this tangle where large balls of burdock burs were found massed together beneath the plants, and the snow had been packed as if by a flock of hens within their yard. Undoubtedly the pheasants were feeding upon the seeds of the burdock, but nearly every bur opened revealed one or more insect larvae. Several of the masses of burs were picked up from the ground just as the pheasants had left them and a big ball was made from the burs picked directly from the plants. These were taken to the laboratory and a careful count of the worms in each bur was made both for those that had previously been picked by the pheasants and for those which had been taken directly from the plants. The evidence thus obtained indicated that the pheasants were feeding upon the insect larvae within the seeds of the burdock, thereby obtaining a very important part of their diet.

These few experiences in the field have been given to demonstrate why my opinion has been so radically changed regarding the daily interrelations that comprise the true life of our wild animals in their homes. Like every boy who has read school books and bedtime stories and has listened to the tales of trappers, sportsmen, and even statesmen, had acquired an unconsciously biased conception of the true nature of life. To kill and be killed has always stood out as the predominating relationship, and is of course an important one. However, many thousand recorded and classified notes of the daily observations made on this one area over a three-year period show that it is by no means the whole story.

Much of this information has not as yet
(Continued on page 90)



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In the illustration above the landscape architect has created a design of dignified hominess seldom achieved. All garden effects should be thus designed. Inexpert plantings by shrubbery peddlers is destructive of the very elements that represent good taste.

No matter how simple your planting problem may be you should permit an experienced landscape architect to design it. Especially is this advisable since the inception of the new Home Garden-Design Service which now makes available complete landscape designs for as little as \$7.50. This organization is a small group of expert landscape architects, well qualified to maintain the infinite richness of existing associations—or to further enhance from their own complete experience and resourcefulness. Address your problems to Home Garden-Design Service, 180 Madison Avenue, New York City.

A HAPPY COMMUNITY

(Continued from page 88)

been finally analyzed, but examination to date of the samples which indicate the food taken by predators during each month of the year provides evidence that the normal interrelations on this area at the present time can be but little improved by man. This tentative conclusion is further substantiated by the remarkable increase of that exceptional game bird the ring-necked pheasant. The seven birds which were introduced onto the area in 1925 have multiplied until now there is an annual increase of between three hundred and fifty and four hundred birds.

An annual crop of fur can now be taken from this area without depleting the furbearers if the time and extent of trapping are properly considered. Unforeseen conditions may at any time require man to lend his assistance to the animal life of the area, as it is necessary for farmers and game keepers to use artificial means of protecting poultry and game birds kept in confinement. But the information to date indicates that a campaign against the predators on this area in general would prove unwise and possibly result disastrously.

ARCTURUS—A REMARKABLE STAR

(Continued from page 84)

at maximum eclipse there will be visible a thin ring, or annulus, of light surrounding the moon, will pass over Alexandria and Bagdad. Jerusalem, Delhi, Calcutta, and Rangoon will be on or very close to the edge of the path, which will also cross northern Australia and leave the earth at sunset off the coast of Queensland.

August is the month, we may recall, in which one may see meteors on almost any clear night. According to a report of the American Meteor Society, in the year 1832, 365 observers reported seeing a total of about 32,700 Perseids. This shower has been said to have a duration of about six weeks beginning in July, although it may be that the meteors observed in July and after August 19 belong to other streams of meteors. The Perseids are generally supposed to be following in the path of Tuttle's Comet, known also as Comet 1862 III, which has a period of 120 years. They are the best known of all the meteoric showers and may be counted upon to furnish a display of celestial fireworks, continuous, if not spectacular, in the early days of August with the maximum number due about August 10. Their radiant lies in the constellation of Perseus, whence their name. They are yellowish in color, move with moderate meteoric velocity, and should be seen in greatest numbers near midnight and, of course, when the moon is not on the scene. As it is full moon on August 5 this year the maximum display from August 10 to 12 should occur under quite favorable circumstances with the moon not appearing until late in the evening.

Comradeship

"In April we had a surprise snowstorm," writes Glenda E. Porter of Flagstaff, Arizona. "About five inches fell within thirty-six hours. This was a surprise and somewhat of a calamity to the birds which had just arrived from the South. Food was hard to find, so they were forced to leave the

shelter of the pine forest for back door yards. This gave us the idea of feeding the birds. We placed whole slices of stale bread on a box in the yard. Groups of robins, juncos, and blue-fronted jays came to take advantage of the food. The jays carried whole slices of bread to nearby trees, while the robins ate their dinner at the table instead of taking it to the forest. One blue-jay proved an exception. He was a cripple with only one leg. He flew to the perch immediately over the food and waited. Soon another jay came, took some bread in his beak and carried it to the cripple whom he fed just as he would have a fledgling. This happened two mornings in succession; then, they failed to come back. Is this not an exceptional act among jays?"

Page Jim Farley

On the porch of his suburban Cincinnati home Henry Koepfle has a mail box—which is, of course, not remarkable. Then the bird nesting season came along and took this mail box out of its mediocrity. Two or three times Mr. Koepfle discovered bits of straw, cotton and lint in the box and cleaned it out, blaming the boy next door or the twins down the street. But the box kept filling up; so he decided to find out who was up to this mischief. He found out. A pair of patient and persistent wrens were setting up a ménage. The glass door of the metal box had been broken, making a fine entrance. So immediately Mr. Koepfle lettered a sign which read: "Keep Off. Use Temporary Mail Box." The wren family was raised to maturity with the good wishes of the entire neighborhood, the postman and the boy next door, not to mention the twins down the street.

About Bees

Mr. Allen Latham of Norwichtown, Connecticut, whose business is bees and honey and such like, writes that he read our June issue with much interest, particularly Stephen Haweis' story of insect superstitions. He suggests, however, that the author re-read the 14th Chapter of Judges.

"He has surely confused in his mind two tales," Mr. Latham writes. "Samson's finding of the swarm of bees which had taken up its abode in the chest cavity of the skeleton of the lion should be of great interest to all beekeepers. Here was the first 'frame hive' of all time. Unquestionably the bees fastened a comb to each rib.

"The fact that Samson took honey from this swarm of bees should tell Mr. Haweis that he has confused this story with the old wives' tale of the origin of a swarm of bees. An old recipe for getting a swarm of bees was to kill a heifer and let the carcass lie a few days, and then, behold, it would be full of worms and shortly thereafter give forth a swarm of bees.

"Possibly the healthy idea held by most people that it is well to keep at a distance from bees may explain why flies and bees can be mistaken for one another."

And Mr. Haweis' father was a clergyman, too!

A Smart Snake

Some twenty years ago Charles E. Graves of McKinney, Texas, saw a wild life drama he has never forgotten. It took place by a farm lot pool, the margin of which was grown with weeds. He saw a small bull-

frog darting over a clump of weeds toward the water. Suddenly a snake reared its head above the weeds searching for the frog, seemed to judge the distance of its leap, lowered itself and appeared again between the frog and the pond. The frog jumped again and was caught, head on, by the snake who had calculated nicely.

Nest Camouflage

"For a number of years," writes Mrs. E. R. Cochran of Pittsburgh, "a pair of robins have been coming to our garden very early in the spring, long before there are any green leaves on the trees. Consequently they like to build their nest in one of our rhododendron bushes. Last spring, in addition to the white string that I always throw out to them (they have never used any colored string that I have thrown out), I also threw out some carefully torn strips of white cloth. This spring, instead of building in our shrubs or using last year's nest, I watched them tear completely apart the nest they built last spring, and they built a new nest upon the insulators for the electric light wires of my neighbor's newly-painted white house. The robins built the nest as usual, and when done, dropped the strips of white cloth from interstices in the nest, straight down on all sides so that the nest was well camouflaged to the casual observer."

Yosemite Birds

The May, 1933, issue of *Yosemite Nature Notes* of the Yosemite Natural History Association is a particularly interesting and valuable issue since it is devoted exclusively to the birds of Yosemite National Park. It contains a check list of the birds and descriptive life habit material on the permanent avian residents of Yosemite Valley. It is illustrated by drawings and is the joint work of M. E. Beatty, C. C. Presnall and C. A. Harwell.

Some Nature Poems

A few years ago Jim Borland (you know Jim—Managing Editor of the Franklin, Pennsylvania, *News-Herald*, Nature lover and columnist of humanity) published a little book of his verses under the title *The Open Country and Other Verses*. It has been out of print for some time now and requests for it have had to go denied. In the interim the muse has not deserted Jim and he has been turning out a poem now and then, all with the feel for the open that is so strong within him. So he gathered some of the earlier ones and some of the more recent ones together and has published a new little booklet of poetry called *Nature Poems and Some Others*. It's swell. And it's beautifully printed, too. Thanks, Jim. R. W. W.

Biology Text

Taking cognizance of progress in science during the last decade, *Biology and Human Welfare* by James Edward Peabody and Arthur Ellsworth Hunt has been brought out in a new edition. Just how extensive revisions are in this excellent text we cannot say without a careful comparison of the two editions, but it would appear that this 1933 volume reaffirms the outstanding character of the textbook. It is published by The Macmillan Company and is listed at \$1.60.

GARDENS AND GARDENING

Edited by

ROMAINE B. WARE

August is the acid test by which all honest-to-goodness gardeners are set apart from the great army of spring gardeners. If your enthusiasm weathers the vicissitudes of summer drought and heat and still sees fathomless opportunities in the great game of gardening, then you may consider yourself a real gardener. Mid-summer is not the easiest time of the year for any kind of garden activity, but he who would keep his garden in presentable condition can not afford to neglect it now. It is not expected that the August garden will display the wealth of bloom and quality of flower found in June borders but with intelligent planning and regular attention, it can enjoy a surprising degree of perfection.

Lawns are universal problems in mid-summer. Somehow weeds seem better able to stand hot weather than grass. But weeds should not be present in lawns. With the various devices and chemicals for getting rid of weeds, there is no excuse for them to usurp our lawns as they do. One of the large lawn seed companies, O. M. Scott & Sons, are offering home gardeners a valuable little booklet, "Lawn Making and Maintenance", 56 pages of up-to-the-minute information. They also issue a four page leaflet five times a year, "Lawn Care", which they are glad to send to those interested. If your problem is lawns, better let them send you copies. This is the season to get after the crab-grass and weed it out before seed forms. Pulling it out by the roots is the surest way and this may be done before seed matures. Careful work over a period of several years can completely eliminate this pest. By the way, there is a device made now to rid the lawn of earthworms by electricity. No more need your lawn suffer from their unsightly work. For putting greens, this new gadget will be a boon.

Making New Lawns

Fall is the best time to make new lawns, excepting in the south, where early spring is better. For fall planting, now is the time to prepare the soil, then you will be ready to plant seed just before fall rains start. Fall is Nature's season for seeding, and, while the grass germinates well in the fall, few weeds start. The result is that grass has an opportunity to get quite well established before weeds put in their appearance. In starting a new lawn, don't slight soil preparation. It is said that in planting roses, one should dig a five dollar hole for a fifty cent bush and with lawns it does not pay to waste good seed on poorly prepared soil.

Soil preparation for a lawn is not so different from other garden making. Ideal conditions find a subsoil of clay and on this four to six inches of fibrous loam with plenty of humus in it. Leaf mold, thoroughly decomposed compost or pulverized peat moss will help materially in making the soil a permanent base for a lawn. When you prepare soil for a lawn, you are making the foundation for vegetation that you expect

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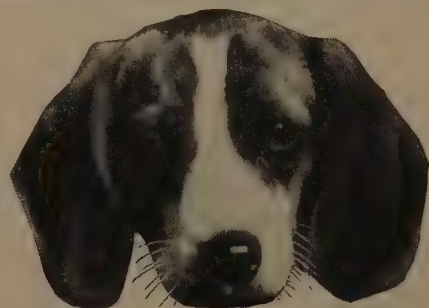
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to last a long time and a careless job will prove unsatisfactory in the end.

A New Ant Trap

Are you bothered with ants in the house or garden? There is a new trap on the market this year, a little, sealed container about the size of an old fashioned hunting-case watch, which is said to supply enough poison of a new kind to kill twenty pounds of ants. This new poison is Thallium Sulphate, odorless and tasteless but sure death to ants. Placed anywhere where ants are bothersome, they will soon find it and, carrying it back to their nest, feeding to the colony, destroy the entire tribe. As the traps are sealed, there is little danger to animals or children. Thallium Sulphate has 50 times the killing power of the usual arsenical ant poisons.

Growing good dahlias is not difficult but if you are not familiar with the best practices, one of the California growers, the Newsom Dahlia Farms, issues a very complete manual on the subject. It is priced at fifty cents but Mr. Newsom writes me he will supply a limited number to readers of NATURE MAGAZINE simply for the asking. This manual contains more than sixty pages and illustrates the different types of flowers. The quality of bloom you get this fall will depend upon the care you bestow on your plants during the next few weeks. Watering, feeding and pinching back are important at this time.

A New Viola

Doubtless many of you have Viola Jersey Gem in your gardens. For some years past it has been the best of all but now another bids fair to steal the leadership. Purple Glory is the new one heralded as much finer than the famous Jersey Gem. It has larger blooms, well over an inch and a half, and is said to flower even more constantly. Purple Glory is new and scarce as yet, though plants were priced last spring at fifty cents each which is not costly for such a good novelty.

If the urge for better gardens has gripped your soul and you would like to learn more about the why and wherefore but feel you can not afford to buy books on the subject, maybe you can spare ten cents for the booklet "Better Gardening—What, When and How to Plant". This handbook for home gardeners is put out by one of the large manufacturers of garden tools, the Union Fork & Hoe Company. It, too, has more than sixty pages of concentrated dope for the gardener and is doubtless the largest ten cents' worth of garden literature on the market.

While on the subject of booklets, a couple recently reached my desk published by the Davey Tree Expert Company. One is "The Care of Evergreens" and the other, "First Aid to Starving Trees". These are available without cost as well as others of similar nature. Your trees and shrubs are valuable adjuncts to your home grounds and their care is of vital importance. Don't neglect them and be careful who you entrust with their oversight. Tree butchers, posing as experts, have ruined, beyond repair, countless thousands of fine specimens and myriads of others are thoughtlessly allowed to starve to death. Better give a thought to your trees and shrubs now.

August Garden Planting

Planting and propagating opportunities of the summer garden are seldom taken advantage of as they might be. Spring is looked upon as the planting season but summer has advantages with certain plants and for some propagating. Two important perennials are best handled now, namely, Irises and Oriental Poppies. If you try to move the latter in the spring, failure is generally the result but now they are through blooming, their tops have turned brown and almost disappeared and they may be taken up, divided or moved with comparative safety.

Irises, too, are in a state of rest just now. Practically all growth has ceased and at any time during the next few weeks they may be taken up, divided and reset with impunity. Iris clumps that have not been divided for three years or more will benefit by attention. Dig them out, shake the soil off and break the clumps apart. You will find this easy to do as they naturally divide themselves into small sections. Don't be afraid to break them apart as you are really doing them a great favor by giving the plants a better chance to develop. Old clumps are so crowded that growth is a struggle and quality bloom hardly possible. Soil preparation for Irises is simple as they are shallow rooted, but the location must be well drained. Given this, break the soil up well, add a handful of bone meal to each plant and if Irises have been in the same spot previously a trowel of air slacked or agricultural lime, mix in thoroughly and set the plants. Do not plant deep; the rhizome or fleshy part of the root should be just at the surface or even half out of the soil. This applies to all tall bearded kinds. The Japanese and Siberian varieties are planted just like other perennials.

Plant New Irises

As this department has urged in the past, don't fail to add some new irises to your garden this year. Good kinds have never been so reasonable and a few dollars will give your garden a wonderful display of color next spring. Now is the time to plant as they will have all the rest of the season to establish themselves and your show of bloom next spring will be all the more wonderful. Right now, today, send for some of the iris catalogs and lists offered by the specialists. Study them carefully and you will be surprised at the values you can get for little money. Search the advertising columns of NATURE MAGAZINE and take advantage of their opportunities.

August is also planting time for the beautiful Madonna Lily. The sooner it is in the ground now, the better results you will get next spring. American grown bulbs are available quite early and if bought from reliable sources are generally considered better than imported stocks. This lily must be planted shallow, placed slightly on its side and covered with not more than an inch or two of soil. Be sure the spot is well drained and add plenty of leaf mold or pulverized peat moss to the soil for a foot or eighteen inches below the bulb. It is well also to set the bulbs in a pocket of coarse sand; that is, surround them on all sides with about an inch of coarse sand or fine gravel.

Order Narcissus Bulbs

You should prepare now to plant Narcissus this fall. They, too, are better if planted early and the latter part of August is not too soon. Order your bulbs now and plan where you will place them. Narcissus are more reasonable than they have been in years and they should again attain their old place as the glory of the spring garden. With a well selected variety it is practical to have blooms for five to seven weeks. Don't overlook the tiny little kinds suitable for rock gardens which only grow four or five inches tall and have dainty blooms but an inch across. Properly planted they are among the finest gems of the early garden.

Perennial seeds may be planted now to flower next year. Study the catalogs and try some of the novelties. Don't overlook the glorious new white Delphinium. It is a fitting companion to the blues and you will thrill at its perfection and charm. Another unusual delphinium is the flaming cardinal-red, *D. cardinale*, Illumination. Pansies, too, should be started now, using the finest seed you can afford. The best strains are a bit costly but more than worth it. Try some of the improved Iceland Poppies and the new Double Hollyhock, Imperator, said to have blooms six inches across. There is also a Giant Hybrid Lupine which grows three to five feet tall with bloom spikes two feet long. The variety of perennials is almost endless and you will want to try a lot of them. Fix yourself a small cold frame and start your seeds in it. Moisture and growing conditions are more easily controlled in a frame.

English Daisies and Canterbury Bells, both of them biennials, can be seeded now for bloom next year. Foxgloves, biennials if allowed to go to seed but perennials if the flowering stalks are removed promptly, may be seeded now. The new Shirley hybrids will grow five to seven feet tall with long flower spikes. Fall Crocus and Colchicums, both blooming in the fall, are bulbous flowers that may be planted now and will give you blossoms in a few weeks.

Climbing Roses and the strongest varieties of garden Roses may be propagated now from cuttings. Select firm, green wood, insert deeply in sand and cover with fruit jars or other glass containers till they root. Climbing roses can thus be produced and planted lavishly around the garden. Don't neglect to prune the small flowered or rambler type climbing Roses as soon as their blooms fade. The larger flowered climbers, like Dr. Van Fleet, should be pruned sparingly, just enough to keep them within bounds. Mulch all Roses with peat moss to conserve moisture but avoid cultivating it in as Roses like a heavy soil.

EDITOR'S NOTE—Don't forget that NATURE MAGAZINE maintains a "Consulting and Advisory Service" for home gardeners. If there is any variety of plant or seed you can not locate, drop us a line and we will try to help you find it. Our catalog file includes several hundred gathered from all sections of the country and also sources for a wide variety of tools and equipment. Write us of your problems, tell us of your successes. Let us help you and help others by passing on the dope you send in.



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Prize for Slogan

To obtain a slogan which will effectively stigmatize the use of live decoys in luring wildfowl as the degradation of sport and sportsmen that it is, the Emergency Conservation Committee, 734 Lexington Avenue, New York City, offers a prize of five dollars. The announcement places no word limit but the presumption is that the slogan should be as brief as possible. The award will be made after the first of October, which, we gather, is the closing date of the contest.

For Nature Poets

Once again the Chattanooga Writer's Club announces its annual Elberta Clark Walker Memorial Nature Poetry Contest. The contest closes on November 1, 1933. Those interested in the full details should send a stamped return envelope to Miss Virginia Lee Bowen, 34 Fort Wood Apartments, Chattanooga, Tennessee.

For Dog Poets

To obtain outstanding dog poems in English, an annual dog poetry award has been announced by *Dog World Magazine*, 3323 Michigan Boulevard, Chicago, Illinois. The contest offers ten annual cash prizes ranging down from \$25, and closes December 31, 1933. There is no limitation on the length of the poetry or the form of verse. No manuscript will be returned unless return envelope is supplied.



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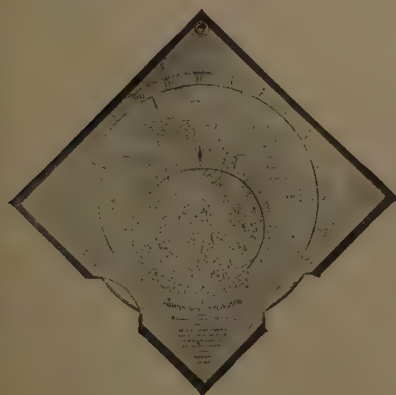
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The Forestry Issue

Clear and straightforward in its writing, constructive and dispassionate in its criticism, timely when far greater public attention is directed to the subject than ever before in our history, *Forestry—An Economic Challenge* by Arthur Newton Pack is distinctly a book of the moment. This significant and pertinent volume has just come from the presses of The Macmillan Company and is listed at \$1.25, a modest investment for a thought-stimulating book.

Mr. Pack urges that the time has come to "re-think" forestry, to discard old conceptions that no longer have basis in fact and to face the whole problem of land use. He traces the history of forestry thought in the light of both economics and sentimentalism, and points out that forestry has progressed from a crusade to an economic problem. He asserts that "after all, forestry, since it deals with the day after tomorrow, does involve a certain need for prophecy and, above all things, it demands a belief in the future."

"The past decade," Mr. Pack declares, "has brought about profound changes not only in the forest situation, but also in our conception of the rôle forestry must play in our economic existence. With true Anglo-Saxon dependence on the method of trial and error, we have blundered along without making any worthwhile progress on the main problem. We are still face to face with a decision as to whether forestry shall rely on regulation, acquisition, or some other method. We cannot prophesy whether any of these steps is possible, or which is best. Yet, until forest devastation is stopped, forestry itself has not succeeded. We have not yet put our forests in order and that is our job. We have not yet any national policy. We drift. There is lack of leadership; a lack of unity among foresters, and, worst of all, a lack of national planning sufficiently comprehensive even to suggest any definite remedy. . . . Forestry is part of the national economic scheme, and, in order to reach its proper and destined plane of usefulness, it must be fitted into that scheme as part of an integrated whole."

"Cooperation with private owners of forest land has not succeeded. Regulation as a remedy seems remote. Wholesale acquisition of public land, even if possible, will not be enough. Forest planning based on a hitherto untried scale—on a national scale—is needed now. A coordinated integration of forestry within the national scheme as a major agency of land use, based on adequate knowledge of conditions and backed by vigorous and effective leadership, is required along a united front wherein our land administrative agencies, both public and private, shall fit in and perform their allotted tasks. Whether the forestry profession possesses the leadership, the force and the clear thinking to solve these problems and carry out a remedial program on a national scale belongs to the future."

About Caves

An interesting history of Mammoth Cave, Kentucky, has been compiled by Helen F. Randolph and published under the title *Mammoth Cave and the Cave Region of Kentucky*. This is a fascinating subject and this little book is enhanced by much illustration. A bibliography of Mammoth Cave is included.

NATURE IN PRINT

As a convenience to readers to whom book stores are not easily accessible the books reviewed in this department of Nature Magazine may be ordered through our own book department.

Child's Book

One of the most attractive child readers we have ever seen has been published by Scott, Foresman and Company under the title of *Art Stories, Book One*. It is the combined work of William G. Whitford, Edna B. Liek and William S. Gray and is, we assume, the precursor of a series which will be remarkable if it lives up to the first volume. The theory of the reader is new to us, being devoted to providing reading exercises which at the same time stimulate an appreciation of beauty. The illustrations are many and beautiful. The text is done with remarkable care. We tried the book out on our seven-year-old and can report a most satisfactory reaction. It has, in fact, been installed as a favorite among many and is being read for the third time at this writing. How school readers have progressed since our day! We should say, also, that this would be a worthwhile gift to a child as well as a fine school book. The list price is sixty-eight cents.

R. W. W.

Plant Names

The history of botanical knowledge is a fascinating subject and, of course, an essential part of it is concerned with the classification and naming of plants. How this was all achieved is fascinatingly told in *How Plants Get Their Names* by Liberty Hyde Bailey. The outstanding figure in botanical nomenclature is, of course, Linnaeus, and the author devotes an interesting chapter to a biography of this great naturalist. This book is by an authority and its style is entertaining as well as highly informative. It is of special interest to all interested in botany and it also has its fascination for the absolute layman who knows little or nothing about plants and the names they go by. The volume is published by The Macmillan Company and sells for \$2.25.

Jungle Bees and Wasps

Much has been written about Barro Colorado Island, the jungle island in Panama where the tropical research station is located. But it was left for Phil Rau to write the story of the Neotropical bees and wasps of that region. He has done this most notably in a volume entitled *Jungle Bees and Wasps of Barro Colorado Island*. The manner of life of these insects is one of endless fascination, and the story of the familiar ones of the northern hemisphere has been thoroughly and variously told. Now we have the story of their interesting relatives of Central America and an entertaining one it is. Mr. Rau has written in an attractive style intelligible to the lay-

man and valuable to the entomologist. His text is profusely illustrated. Mr. Rau has brought the volume out himself and it is available from him at Kirkwood, St. Louis County, Missouri, at \$2.75.

Penn's Woods

Pennsylvanians are justly proud of their trees, about the trunks of many of which have taken place events of historic importance. It is most appropriate, therefore, that information should be assembled about the outstanding trees of the Keystone State as a part of the commemoration of the two hundred and fiftieth anniversary of the coming of William Penn to what we know now as Pennsylvania. This has been admirably accomplished in a little book entitled *Penn's Woods*, written by Edward E. Wildman, director of science education in the Philadelphia public schools. Fascinating to any Pennsylvanian or to any visitor to that State, the book is available at \$1.50 from Edward E. Wildman, Room 320, Parkway at 21st, Philadelphia.

Four Seasons

A new book upon my desk this morning is one by the author of many fine Nature books, Edith M. Patch, and her co-author, Harrison E. Howe. The title is *Through Four Seasons*. It is the fourth in the series of Nature and Science Readers, published by The Macmillan Company and suitable for children from six to ten years of age. In their preface the authors say "that there is not room in one book to tell about more than a few of the wonderful things in the world, for a book is small and the world itself is very large. There are indeed more interesting things in the world than have ever been described in all the books that have been printed." That is all very true; there are many Nature books on the market most of them interestingly written and often in an entirely new vein. Such a book is the one now before me. Parents with growing children to interest and who already have other books by this gifted author need no further detailed description—to others not as yet acquainted with her work I suggest that they buy this one, which is crammed full of valuable information, and use for the children's story hour.

R. B. H.

About the Conifers

Four re-issues testify to the popularity and excellence of *The Cultivated Evergreens* by L. H. Bailey, and that volume is now off the market. There now comes a worthy successor by the same author, this time with the title *The Cultivated Conifers*. It brings information up to date in this field and provides data in keeping with the increasing interest in the conifers from the decorative viewpoint. Cultural as well as botanical information is included and new illustrations have been provided. It is a notable book and one for any gardener's library. It is beautifully printed by The Macmillan Company and sells for \$7.50.

New Biology Text

An excellent addition to biology textbooks is made in *An Introduction to Biology* by Dr. Elbert C. Cole, who is Professor of Biology at Williams College. The author's approach to his subject, while not differing

CHOOSING A SCHOOL

By Richard Deshon

Director, School Service
Nature Magazine

There are more than 1000 boarding schools for boys of high school age in the United States, and as many more for girls. This does not include specialized, sectarian or elementary schools. Type and location are two considerations governing choice.

LOCATION

While the largest number of private schools are closest to the cities of the eastern seaboard, there is now a general distribution of excellent schools. The geographical location settled, the next question is whether the school has ample acreage for recreation to care for children requiring outdoor exercise.

TYPE

Choice of the type of school is important. It depends on whether the child is going to college and what college; whether a fine arts, dramatic arts or vocational training is needed; whether a junior college is advisable; or whether particular limitations of the child need attention.

* * *

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vastly from that of similar texts, is admirably planned and offers sufficient material for a year's course as well as adequate latitude for the selection of study topics. The volume is well illustrated with half-tones and line drawings and the author has supplied full and excellent captions for the illustrations, adding much to their value. A careful selection of references to supplementary and advanced texts has been made, and interesting suggestions for laboratory work and home demonstrations are included. The publishers are John Wiley and Sons and the list price is \$1.75.

A New Edition

Reflecting scientific progress during the past decade, a new edition of *Biology and Human Welfare* by James Edward Peabody and Arthur Ellsworth Hunt has just come from the presses of the Macmillan Company. In its original edition this volume offered a fresh viewpoint from which to consider biology, as is indicated by its title. It brought the subject home to the student in terms of his own life and the lives of those about him and those about whom he had read. Scientific knowledge does not stand still, however, and ten years of research and invention make a great difference in these days. Thus the authors have had an interesting task in bringing their textbook up to the moment and they have done it interestingly. This is now an even more valuable school text than in 1924.

A Garden Book

An interesting garden book, and one that is outstanding from the pictorial point of view, is *Gardens and Gardening*, the 1933 edition of the Studio Gardening Annual. It is an international garden book since one of its features is the presentation of representative pictures of foreign gardens. There follows a section devoted to flowering shrubs and a fine, illustrated chapter by V. N. Solly on small gardens. The remainder of the volume is devoted to perennials in the modern garden and to some new and lesser-known flowers. The book is edited by F. A. Mercer and is published by The Studio Publications, Inc., 381 Fourth Avenue, New York City. It sells for \$2.50 in the paper binding and \$3.50 in the cloth binding.

Louisiana Fishes

Fishes and fishing loom large in Louisiana, both as items of commerce and sport, and this fact gives ample reason for the compilation and publication of *Fishes and Fishing in Louisiana*. This is brought out as Bulletin No. 23 of the State Department of Conservation and is the work of James Nelson Gowanloch. It is a companion volume to Bulletin No. 21, which deals with the sea fishes and fisheries of the State. Together they give a marvelously complete picture of this resource. The volume is of special interest to the fisherman. It is well illustrated and includes several color plates. A good index and bibliography is provided, and there is a section devoted to recipes for cooking fish. No other State has done a better piece of work about its fishery resources than has Louisiana in this volume.



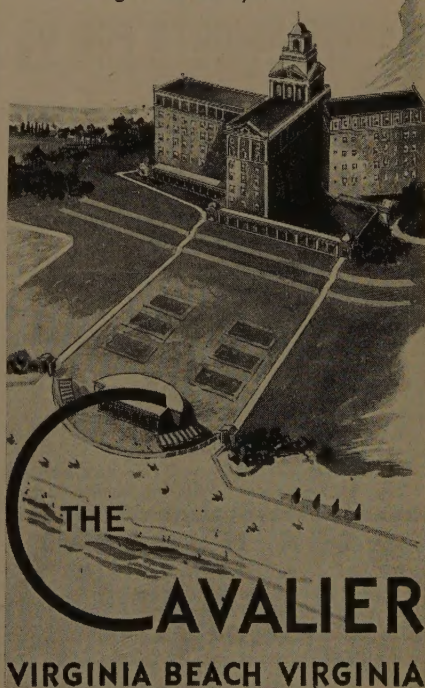
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Amateur Biologists

In order to provide a forum for the exchange of research results and interpretations, the American Amateur Biologists Society has been organized on a non-profit basis. Its director is R. J. Schwartzmiller and headquarters are at 737 West Ionia Street, Lansing, Michigan. The first issue of the Associations Journal has been published, a mimeographed publication containing material of interest to the experimenting amateur biologist. Further information may be obtained from the director, who advises us that copies of the Journal may be had for ten cents.

COLOR MOVIES

(Continued from page 50)

no color in the film at all, but when it is projected through a special filter attached to the projector lens, the results appear in the full beauty of true color. A very high-grade projection screen is necessary because the filter absorbs so much of the light, but, with the best modern projectors, it is possible to get very satisfactory color movies up to 24 inches by 30 inches in size. Experts agree that this amateur Kodacolor Process is as fine as any process of color photography available, even at high cost, to professionals. Like all color processes, it requires a very high degree of accuracy in estimating the exposures, but with a little experience any amateur can produce a satisfactory percentage of good results. In fact, his very first attempt will be successful, if he follows directions.

There have been other color processes developed for amateur movies. The most highly perfected of these is put out by the firm of Bell & Howell and known as the Morgana Process. It has the advantage of permitting projection of a larger picture than does the Kodacolor Process, but the final effect is made up from the combinations of two primary colors only and is, therefore, not so true to nature as the Kodacolor Process. Its chief use has been commercial and educational, such as for photographing operations in hospitals. However, it is very simple for the amateur to operate and is available to anyone who wishes to pay the cost of the special camera necessary.

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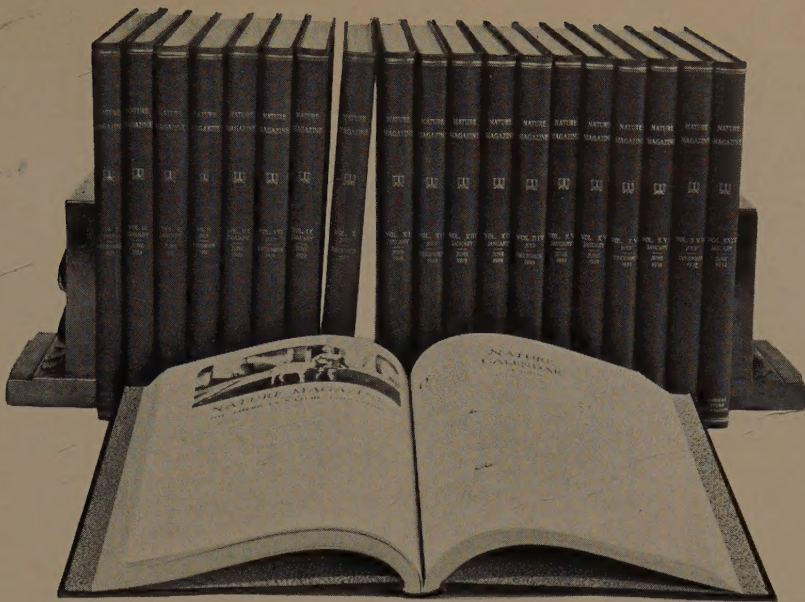
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